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MUSEUMS ASSOCIATION.



SHEFFIELD MEETING.

1898.



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MUSEUMS ASSOCIATION.

REPORT OF PROCEEDINGS

WITH THE PAPERS READ AT THE

NINTH ANNUAL GENERAL MEETING,

HELD IN SHEFFIELD—JULY 4 TO 8, 1898.



EDITED BY

HERBERT BOLTON, F.R.S.E.,

Curator and Secretary, The Bristol Museum.

LONDON :

DULAU AND CO

1899.



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EDITORIAL NOTE.

THE Editor exceedingly regrets that so long a time has been occupied in completing these Proceedings, which, under ordinary circumstances, ought to have been in the hands of Members and Associates last October.

THE BRISTOL MUSEUM,
May 20, 1849.

LIST OF MUSEUMS AND ASSOCIATES

IN THE ASSOCIATION, WITH NAMES OF REPRESENTATIVES WHO
ATTENDED THE SHEFFIELD MEETING.

Names of Curators in italics.

MUSEUMS.

Baroda, Bengal Pres., India, State Museum . . .	Dundee, N.B., Albert Institute Museum Mrs. Maclauchlan, <i>John Maclauchlan, F.R.G.S.</i>
Blackburn, Lancs., Public Museum . . .	Glasgow, Corporation Museums . . . <i>Bailie Fleming Anderson, Counc. Sorley, Jas. Paton, F.L.S.</i>
Bolton, Lancs., Chaddick Museum . Ald. J. T. Brooks, Counc. James H. Ferguson, <i>W. W. Midgley, F.R.Met.S.</i>	Hereford, Herefordshire . . .
Bootle, Lancs., Public Museum . . . Counc. Musker, <i>J. J. Ogle.</i>	Kingstown, Jamaica, Museum of the Institute of Jamaica . . .
Bradford, Yorks., Public Museum. Ald. J. Popplewell, Counc. J. S. Toothill, <i>Butler Wood.</i>	Liverpool, Derby and Mayer Museums <i>H. O. Forbes, LL.D.</i>
Brighton, Sussex . . .	London, Hornimans Museum . . .
Canterbury, New Zealand . . .	, Parkes' Museum of the Sanitary Institute . . .
Cape Town, South African Museum	, Sir Henry Peek's Museum . . .
Cardiff, South Wales, Corporation Museum	, Museum, The Pharmaceutical Society . . . <i>E. M. Holmes, F.L.S.</i>
Chester, Cheshire, Grosvenor Museum	Maidstone, Kent, Corporation Museum . <i>F. V. James, F.S.A.</i>
Ceylon, Colombo Museum . . .	

LIST OF MUSEUMS.

Manchester, Manchester Museum,	Salt Lake City, Utah, U.S.A., Deseret
Owens College . Prof. F. E. Weiss, B.Sc., Miss C. Nördlinger, <i>W. E. Hoyle, M.A.</i>	Museum . <i>Prof. J. E. Talmage, Ph.D., F.R.S.E.</i>
,, Queen's Park Museum . . .	Sheffield, Public Museum . Ald. W. H. Brittain, Counc. A. J. Manton, J. D. Leader, <i>E. Howarth, F.R.A.S.</i>
Middlesborough, Yorks. . .	,, Ruskin Museum Ald. J. Gamble, Counc. G. Jackson-Smith, <i>W. White.</i>
Newcastle-upon-Tyne, Barra Bridge .	Stockport, Cheshire. <i>John Tym.</i>
Museum . .	Sunderland, Durham, Corporation Museum . <i>Jas. M. E. Bowley, R.N.</i>
Northampton . .	Sydney, N. S. W., Australian Museum .
Nottingham, University College Museum . . Prof. J. W. Carr, <i>M.A.</i>	Warrington Museum, Lancs. . . Linnæus Greening, <i>C. Madeley.</i>
Oxford University, Museum of Comparative Anatomy	Winchester, Win- chester College Museum . .
Perth, N.B. . . <i>Alex. M. Rodger.</i>	Worcester, Victoria Institute Museum <i>Wm. H. Edwards.</i>
Perth, Western Australia . .	York, Lit. and Phil. Soc. Museum . <i>H. M. Plainauer, B.Sc.</i>
Pittsburg, U.S.A., Carnegie Museum	
Saffron Walden Museum, Essex	
Salford, Lancs., Peel Park Royal Museum . . Counc. F. S. Phillips, <i>Ben. H. Mullen, M.A. (Dub.)</i>	

ASSOCIATES.

Those whose names are printed in italics attended the meeting.

- Abbot, Thomas*, Sheffield.
Anderson, Prof. W. C. F., M.A., Sheffield (Univ. Coll.).
Andrew, H. H., Sheffield.
Balfour, Henry, M.A., Oxford (Pitt-Rivers Museum).
Bather, F. A., M.A., London (British Museum, Nat. Hist.)
Bingham, Col. J. E., Sheffield.
Binney, Jos., Sheffield.
Birks, E., Sheffield.
Bolton, H., F.R.S.E., Bristol (Museum).
Browne, Montagu, F.Z.S., Leicester (Corporation Museum).
Brittain, Miss, Sheffield.
Brittain, H. E., Sheffield.
Brünchorst, Dr. J., Bergen Museum, Norway.
Butterworth, Mrs., Sheffield.
Carr, Mrs. J. W., Nottingham.
Carr, Prof. J. W., M.A., Nottingham (Univ. Coll. Museum).
Carter, Ald. W. R., Sheffield.
Chambers, H. W., Sheffield.
Cheeseman, J. T., New Zealand (Auckland Museum).
Chesterman, W., Sheffield.
Collinson, Henry P., Sheffield.
Crake, William, Hastings.
Croston, J. W., F.G.S., Prestwich.
Davy, David, Sheffield.
Dawes, G. H., Sheffield.
Denny, Prof. A., F.L.S., Sheffield (Univ. Coll.).
Derry, John, Sheffield.
Dixon, H. J., Sheffield.
Donner, Mrs. E., Manchester.
Donner, E., B.A., Manchester.
Firth, E. W., Sheffield.
Firth, B. A., Sheffield.
Fisher, H., Sheffield.
Flower, Sir W. H., F.R.S., London.
Foulds, A. C., Sheffield.
Franklin, Ald. Geo., Sheffield.
Furness, J. W., Sheffield.

LIST OF ASSOCIATES.

- Goldney, F. B., Dover.
Gotonbed, Mrs., Sheffield.
Gould, C., Essex.
Greening, L., F.L.S., Warrington.
Hadfield, R. A., Sheffield.
Hadfield, C., Sheffield.
Hadfield, C. M., Sheffield.
Hall, Miss K. W., London.
Hawksley, G. W., Sheffield.
Henshaw, S., Boston.
Hicks, Principal, D.Sc., Sheffield (Univ. Coll.).
Hicks, Rev. E., D.D., Sheffield.
Hodgson, T. V., Plymouth (Municipal Museum).
Howarth, Miss, Sheffield.
Howarth, Miss E., Sheffield.
Howse, R., M.A., Newcastle (Museum).
Howson, G., Sheffield.
Hudson, W., Sheffield.
Hudson, Mrs. W., Sheffield.
Hughes, Prof. T. M'Kenny, M.A., Cambridge University.
Hughes, Col. H., Sheffield.
Hutchinson, J., London.
Hutton, Captain F. W., Christchurch, N.Z. (Canterbury Museum).
Jackson, Dr. R. T., Harvard University, Mass., U.S.A. (Museum of Comparative Zoology).
Jennings, A. V., F.L.S., Davos Platz, Switzerland.
Jonas, J., Sheffield.
Keeling, Dr., Sheffield.
Langley, Ald. B., Sheffield.
Leahy, Prof. A. H., M.A., Sheffield (Univ. Coll.).
Longfield, T. H., F.S.A., Dublin (Science and Art Museum).
Lord Mayor of Sheffield, The.
Lucas, F. A., Washington, U.S.A. (U.S. National Museum).
Mappin, Sir F. T., Bart., M.P., Sheffield.
Mappin, F., Sheffield.
Marples, E. J. E., Sheffield.
Martin, R. F., London.
Mason, T., London.
Meyer, Dr. A. B., Dresden (Zool. and Anthrop. Museum).
Monks, F. W., Warrington.
Moore-Smith, Prof. G. C., M.A., Sheffield (Univ. Coll.).
Moss, J. F., Sheffield.
Newton, E. T., F.R.S., London (Mus. of Pract. Geology).
Norman, Canon, LL.D., Durham.
Norvill, C. R., Sheffield.
Paton, Miss, Glasgow.
Pawson, H. W., Sheffield.

LIST OF ASSOCIATES.

- Pearson, Rev. V. W., B.A., Sheffield.*
Petrie, Prof. W. M. Flinders, London (Univ. Coll.).
Phipson, Miss Emma, Reigate.
Platnauer, Mrs. H. M., York.
Robinson, J. D., Sheffield.
Rudler, F. W., F.G.S., London (Museum of Pract. Geol.).
Sandford, Rev. F. G., M.A., Sheffield.
Scharff, Dr. R. F., Dublin (Science and Art Museum).
Sclater, Dr. P. L., M.A., F.R.S., London.
Senior, Geo., Sheffield.
Skelton, Sir Chas. T., Sheffield.
Smith, F. W., Sheffield.
Smith, H. I., New York (American Museum, Nat. Hist.).
Smith, Jno., Sheffield.
Smith, Samuel, Sheffield (Delegate from Library Association).
Sorby, Dr. H. C., LL.D., F.R.S., Sheffield.
Stephenson, Sir H., Sheffield.
Stokes, Jno., M.D., Sheffield.
Taylor, Ald. Alfred, Sheffield.
Thomas, Harold, Sheffield.
Tonge, Miss, Sheffield.
Trail, Prof. Jas. W. H., M.D., F.R.S. (Aberdeen University).
Ward, Septimus H., Sheffield.
Watson, A. T., Sheffield.
Weiss, Prof. F. E., B.Sc., Manchester (Owens College).
White, Thomas, London.
Wilson, Sir Alex., Bart., Sheffield.
Woodward, A. Smith, F.L.S., F.G.S., London (Brit. Mus., Nat. Hist.).
Woodward, Dr. Henry, LL.D., F.R.S., London (Brit. Mus., Nat. Hist.).
Woolnough, Frank, Ipswich.
Wright, R. E. Ariel, Sheffield.
Yates, George C., F.S.A., Swinton, near Manchester.

SHEFFIELD LOCAL COMMITTEE.

The LORD MAYOR.	J. D. LEADER, F.S.A.
The MASTER CUTLER.	Prof. A. H. LEAHY, M.A.
The DUKE OF NORFOLK.	W. LLEWELLYN.
Sir F. T. MAPPIN, Bart., M.P.	Dr. J. A. MANTON.
Sir HENRY STEPHENSON.	JOS. MAXFIELD.
Ald. BATTY Langley, M.P.	Prof. G. C. MOORE-SMITH, M.A.
HENRY AUTY.	J. F. MOSS, F.R.G.S.
JOSEPH BINNEY.	H. W. PAWSON.
EDWARD BIRKS.	Rev. V. W. PEARSON, B.A.
Ald. W. R. CARTER.	SAMUEL ROBERTS.
Ald. W. E. CLEGG.	Rev. F. G. SANDFORD, M.A.
H. W. CHAMBERS.	Dr. SIMEON SNELL.
Dr. G. H. DAWES.	H. STUBBS.
T. G. DERBY.	JOHN SMITH.
J. DERRY.	SAMUEL SMITH.
R. H. DUNBAR.	G. JACKSON SMITH.
Dr. WILLIAM DYSON.	Ald. ALFRED TAYLOR.
J. J. GRATTAN.	HAROLD THOMAS.
Rev. E. HICKS, M.A., D.D., D.C.L.	A. T. WATSON, F.L.S.
CHAS. HOBSON.	Rev. J. G. WILLIAMS.
HERBERT HUGHES.	A. MUIR WILSON.
Ald. M. HUNTER.	J. WYCLIFFE WILSON.
RICHARD Langley.	J. C. WHITELEY.
	R. E. ARIEL WRIGHT.

LOCAL SECRETARY.

C. BRADSHAW, F.C.S.

LOCAL TREASURER.

Dr. J. STOKES.

1898.

PLACE OF MEETING, - THE TOWN HALL, SHEFFIELD.

PROGRAMME OF PROCEEDINGS.

MONDAY, JULY 4TH.

2 p.m.	Meeting of Council in the Town Hall. Reception Room opened.
3 p.m.	Drive to Ruskin Museum, Meersbrook Park.
	* "Practical Notes, and Suggestions on Modes of Exhibiting Museum Specimens." By WILLIAM WHITE.
4.30 p.m.	Drive from Ruskin Museum to Southbourne.
5 to 7 p.m.	Alderman GAMBLE (Chairman of the Ruskin Museum) and Mrs. GAMBLE "At Home," at Southbourne, Clarkehouse Road.

TUESDAY, JULY 5TH.

10 a.m. to 1 p.m.	Presidential Address by Alderman W. H. BRITTAINE, F.R.G.S.
	† "Museums in Relation to Art Teaching." By Prof. W. C. F. ANDERSON, M.A.
	"The Relation of Museums to Elementary Education." By Professor A. DENNY, F.L.S.
	"A People's Palace." By JAMES PATON, F.L.S.
	‡ "Museums from a Philistine's point of view." By R. E. ARIEL WRIGHT.
1 to 2 p.m.	Luncheon in the Town Hall, by kind invitation of the Lord Mayor, on July 5th, 6th, and 7th.
2 p.m.	A visit was paid to University College, Sheffield Public Museum, and the Mappin Art Gallery in Weston Park.
4 to 6 p.m.	Garden Party at Storth Oaks, Ranmoor, by invitation of the PRESIDENT and Mrs. BRITTAINE.

* Included in the present Report as a Paper (*see page 129*). † Not sent in. ‡ Withdrawn from publication.—ED.

PROGRAMME OF PROCEEDINGS.

WEDNESDAY, JULY 6TH.

10 a.m. to 1 p.m.	* "Note on some Arrangements and Fittings in the Sheffield Museum," By E. HOWARTH, F.R.A.S., F.Z.S. * "Methods of Preservation and Arrangement of Seaweeds for Exhibition." By Professor F. E. WEISS, B.Sc. "The Arrangement of Museum Herbaria." By E. M. HOLMES, F.L.S. "Sculpture in Art Museums." By JOHN MACLAUCHLAN. "Provincial Museums and the Museums Association." By H. BOLTON, F.R.S.E. "The Electric Light Installation at the Manchester Museum." By W. E. HOYLE, M.A. "The Cleaning of Museums." By Miss C. NÖRDLINGER.
1 to 2 p.m.	Luncheon in the Town Hall, presided over by the Lord Mayor.
2 to 5 p.m.	The Members visited the works of Messrs. JOHN ROUND & SON (by permission of Alderman Gamble, Chairman of Directors), and those of Messrs. WALKER & HALL (by permission of Mr. Bingham), and saw the process of electro-plating. Afterwards the rolling of an armour-plate for H.M.S. "Ocean" was witnessed at Messrs. CAMMELL & Co.'s works (by permission of Sir Alexander Wilson, Master Cutler).
7 p.m.	Association Dinner in the Masonic Hall.

THURSDAY, JULY 7TH.

10 a.m. to 12 p.m.	"The Individuality of Museums." By WILLIAM WHITE. "Marine Animals mounted as Transparencies for Museum Purposes." By H. C. SORBY, LL.D., F.R.S. "The Ethnological Arrangement of Archaeological Material." By HARLAN I. SMITH. "The Australian Museum." By S. SINCLAIR, Secretary.
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* Not sent in.—ED.

PROGRAMME OF PROCEEDINGS.

THURSDAY, JULY 7TH.—*continued.*

	“Some Russian Museums.” By F. A. BATHER, M.A., F.G.S.
12 to 1 p.m.	General Business Meeting.
1 to 2 p.m.	Luncheon in the Town Hall. A party was conducted over the Langsett Water Works by Mr. W. Watts, F.G.S., Engineer, who also explained the geological features of the district.

FRIDAY, JULY 8TH.

By invitation of the Local Committee, a visit was paid to Castleton, sixteen miles from Sheffield—very picturesquely country being passed through on the way. On arrival, Mr. John Tym, Curator of the Stockport Museum, acted as chief guide to the “Blue John” mine, where fluor spar was seen *in situ*; to the Castle made famous by Scott in his “Peveril of the Peak”; and to the neighbouring caverns and mines.

The meetings were held and papers read in the City Council Chamber, the room adjoining being used as reception room.

By the kindness of the Committee of the Sheffield Press Club, Delegates and Associates had all the privileges of membership during the meeting.

GENERAL MEETING.

JULY 7, 1898.

The HONORARY TREASURER read the Financial Statement, which was adopted by the meeting, and a vote of thanks was accorded to him on the motion of the PRESIDENT, seconded by Mr. J. PATON.

Resolved, on the motion of Mr. W. W. MIDGLEY, seconded by Mr. Wm. WHITE, that the election of President and Vice-Presidents be left with the Council.

Resolved, on the motion of Mr. C. MADELEY, seconded by Mr. W. W. MIDGLEY, that the retiring members of the Council be Mr. C. Madeley, Mr. W. W. Midgley, Dr. Benham, and Councillor James Steele.

Resolved, on the motion of Mr. J. PATON, seconded by Mr. W. E. HOYLE, that the four following members be added to the Council, viz.:—Mr. W. E. Hoyle, Dr. J. Stokes, Mr. J. M. E. Bowley, and Mr. J. Maclauchlan.

Mr. W. E. HOYLE gave notice of alteration of rule respecting the nomination and election of members of the Council.

Resolved, on the motion of Mr. H. M. PLATNAUER, seconded by Mr. J. M. E. BOWLEY, that Ald. W. H. Brittain be elected Treasurer.

Resolved, on the motion of Mr. J. PATON, seconded by Mr. E. M. HOLMES, that Mr. E. Howarth be elected Secretary.

Resolved, on the motion of Mr. H. M. PLATNAUER, seconded by Mr. F. A. BATHER, that Mr. H. Bolton be elected Editor.

Resolved, on the motion of the PRESIDENT, seconded by Mr. BEN. H. MULLEN, that Messrs. H. Bolton, F. V. James, J. Maclauchlan, and T. H. Longfield be appointed a Committee to obtain information respecting museums on the lines of Mr. Bolton's paper, and that the General Secretary prepare a form to be sent to museums.

GENERAL MEETING.

Resolved, on the motion of the PRESIDENT, seconded by Mr. BEN. H. MULLEN, that "The Museums Association, in general meeting assembled, while recognising the good which has accrued to provincial museums by the annual grant contributed by Government in aid of the purchase of objects for provincial museums, are of opinion that the sum annually placed at the disposal of the Science and Art Department for this purpose should be considerably augmented; and, further, that it would be most satisfactory to have this annual sum fixed at not less than £3000;

"And that copies of this resolution be forwarded to (1) The Secretary of the Department of Science and Art; (2) The First Lord of the Treasury; (3) His Grace the Duke of Devonshire, President of the Council on Education; (4) Sir John Gorst, Vice-President of the Council on Education;

"And that the Committee of each museum represented in the Association should be urged to bring pressure to bear upon the Members of Parliament of their respective districts to support this appeal."

Resolved, on the motion of Mr. H. BALFOUR, seconded by Mr. W. E. HOYLE, that the most cordial thanks of the Association be given to the Lord Mayor and Corporation of Sheffield for granting the use of the Town Hall for the meetings of the Association, and for the very kind reception accorded to the members.

MUSEUMS ASSOCIATION.

STATEMENT OF INCOME AND EXPENDITURE FOR THE YEAR ENDING JUNE, 1898.

RECEIPTS.	EXPENDITURE.
Balance from previous Year,	- £65 0 10
Members' Subscriptions, 1897,	- 37 17 0
" Arrears, 1896,	- 1 2 0
Associates' Subscriptions, 1897,	- 13 2 6
" Arrears, 1896,	- 2 2 0
Advertisements,	- 5 12 6
Report of Proceedings,	- 3 15 0
Xviii: Bank Interest,	- 1 11 10
<hr/>	
	£130 3 8
Balance brought forward,	- £63 0 11
Members' Subscriptions, 1898,	- 9 8 0
Associates' Subscriptions, 1898,	- 12 12 0
Balance in Bank,	- £85 0 11
<hr/>	
Associates' Subscriptions in Arrears,	- £4 4 0
<hr/>	
6th July, 1898.	
E. HOWARTH, <i>Secretary and Treasurer.</i>	
<hr/>	
Audited and found correct, CHARLES MADELEY. JOHN J. OGLE.	

COUNCIL, 1898-99.

PRESIDENT.

Alderman W. H. BRITTAIN, F.R.G.S.

PRESIDENT-ELECT.

Alderman A. J. HAWKES, Mayor of Brighton.

PAST PRESIDENTS.

J. WILLIS CLARK, M.A.	The Rev. Canon NORMAN,
W. BOYD DAWKINS, M.A.,	M.A., F.R.S.
F.R.S.	JAMES PATON, F.L.S.
Sir W. H. FLOWER, D.Sc.,	Prof. E. RAY LANKESTER,
F.R.S.	LL.D., F.R.S.

VICE-PRESIDENTS.

- Professor W. C. F. ANDERSON, M.A. (Sheffield).
Professor A. DENNY, F.L.S. (Sheffield).
Alderman JOSEPH GAMBLE (Sheffield).
Principal HICKS, D.Sc., F.R.S. (Sheffield).
H. M. PLATNAUER, B.Sc., F.G.S. (York).
H. C. SORBY, LL.D., F.R.S. (Sheffield).

ORDINARY MEMBERS OF COUNCIL.

- 1894—Professor J. E. TALMAGE, F.R.S.E. (Salt Lake City).
1895—F. A. BATHER, M.A., F.G.S. (Brit. Mus., Nat. Hist.).
HENRY COATES, F.R.S.E. (Perth, N.B.).
1896—H. O. FORBES, LL.D. (Liverpool).
T. H. LONGFIELD, F.S.A. (Dublin).
1897—HENRY BALFOUR, M.A. (Oxford).
E. M. HOLMES, F.L.S. (London).
JOHN WARD, F.S.A. (Cardiff).
1898—JAS. M. E. BOWLEY, R.N. (Sunderland).
W. E. HOYLE, M.A., F.R.S.E. (Manchester).
JOHN MACLAUCHLAN (Dundee).
JOHN STOKES, M.D. (Sheffield).

TREASURER.

Alderman W. H. BRITTAIN, F.R.G.S. (Sheffield).

EDITOR OF PROCEEDINGS.

H. BOLTON, F.R.S.E. (Bristol).

GENERAL SECRETARY.

E. HOWARTH, F.R.A.S., F.Z.S. (Sheffield).

MUSEUMS ASSOCIATION RULES,

AS AMENDED AND ADOPTED AT THE OXFORD MEETING, 1897.

1.—That this Association be called the "MUSEUMS ASSOCIATION," and shall consist of representatives of Museums, of other persons engaged in scientific work or interested in Museums, who may be admitted as Associates, and of Honorary Members. The number of Honorary Members shall not exceed fifteen ; they shall be distinguished either for success in Museum work, or services to the Association ; they shall be nominated by the Council, and elected by the Association.

2.—The object of the Association shall be the promotion of better and more systematic working of Museums throughout the Kingdom. In order to promote a better knowledge of Museums, the Association shall meet in a different town each succeeding year.

3.—That each Museum contributing not less than one guinea a year be a Member of the Association, and that individuals interested in scientific work be admitted as Associates on payment of 10s. 6d. annually.

4.—That each Museum be represented by three delegates, each having one vote. Each Associate to have one vote.

5.—That each Museum belonging to the Association and each Associate receive one copy of the publications of the Association.

6.—That the affairs of the Association be managed by a Council consisting of a President, Vice-Presidents, two Secretaries, or a Secretary and an Editor, a Treasurer, and twelve ordinary Members ; three to constitute a quorum ; all past Presidents to be *ex-officio* Members of Council. The President, Vice-Presidents, and four ordinary Members of Council to retire each year, and to be ineligible for re-election for one year.

7.—The Council to be elected at the Annual General Meeting, and to hold office for one year. The Council shall have power to fill any vacancies that may occur in its ranks between Annual Meetings.

8.—That a General Meeting of the Association be held annually, for the transaction of business, the reading of papers, and the discussion of matters relating to Museums.

9.—The place and time of the Annual Meeting to be determined by the Council.

10.—All new rules, and all resolutions affecting existing ones, to be submitted to the Annual General Meeting. One calendar month's notice to be given of all resolutions affecting the rules.

PRESIDENTIAL ADDRESS

BY

ALDERMAN W. H. BRITTAIN, J.P., F.R.G.S.

I MUST first be permitted to add a few words of warm welcome to that already extended to you by the Lord Mayor. As a Sheffield man, and one who takes a great interest in Sheffield and in everything which tends to elevate or conduces to the benefit of the inhabitants of Sheffield, I am naturally glad to see here the members of the Museums Association, among whom I count so many good friends.

I can assure the members of the Association that I should have suggested long since that Sheffield should have had the pleasure of entertaining them ; but the Corporation of the city possessed no convenient rooms for the purpose until recently—in fact, it had no real home.

It was always my desire that whenever the time should arrive for you to hold your meeting here, it should be in response to an invitation from the Corporation of Sheffield. It is very gratifying to me that that invitation was given, that you accepted it, and that I now have the honour of welcoming you in the Council Chamber of our Corporation.

Last year you met in the ancient and interesting city of Oxford, a city of noble and glorious associations, and most dearly beloved by those who have had the privilege of spending three or four years there, at an age when they were the most impressionable and could best appreciate its fascinations, if not always its benefits.

This year, as a pleasing contrast, you are meeting in the grimy city of Sheffield—a great commercial city of which we are very proud—the centre of most unpoetical trades, where grit, sulphur, and carbon are inhaled, and a canopy of smoke too often hangs over us. There is a saying that Sheffield people thrive on smoke. During your visit you will have the opportunity of taking observations.

In the past the Association has been presided over by men of high scientific attainments, who honoured it by consenting to occupy the presidential chair. Now, on the other hand, you have honoured me by electing me to that position. I assure you I appreciate your kindness. No member of the Association could appreciate it more highly. Still, I seem to think that the position which I have occupied in the past, that of your treasurer, was more my sphere ; and that, howsoever much I may love the work of this Association, and the elevating influence of museums and art galleries generally, your friendly partiality for me has for once, in spite of your exceptional sagacity, led you astray and induced you to commit a serious blunder, which it is now too late to repair.

The address of a President is often a trying ordeal to go through, and I am reminded of what was said, in his modest manner, by the Marquis of Lorne when delivering a presidential address once in Edinburgh. He said—“ Preludes are terrible things at all times. The tuning-up even of a violin is most distressing. Such must be my effort to inaugurate your assemblage. But the full music of knowledge and talent will succeed my discordant notes when you each have your say. If the prelude be rougher than usual, you must remember where you are and have patience, although the first notes may be like that fearful and wonderful sound, the tuning of the bagpipes.”

These remarks seem so appropriate to my position at

the present time that I need not apologise for quoting them. The full music of knowledge and talent will certainly succeed my discordant notes when you *each* have *your* say.

I am certainly not here to talk of science to those who are acknowledged authorities in every branch of it, or of natural history to those who have made a life study of it. It will be wise, I imagine, to confine the few words that I shall address to you chiefly to the relation of museums to municipal life.

I think members of other Corporations, as well as curators of museums, might be interested to hear that we in Sheffield have had to work, perhaps as much as they have had to work in most towns, before we were the proud possessors of museums, parks, and art galleries.

Great strides have been made by other towns towards rendering the lives of the people happier, and the lot of those who have to toil in narrow streets, and lanes, and grimy workshops day after day more endurable; but I should think no place can show a more marvellous change during the last quarter of a century than Sheffield.

I became a member of the Corporation in 1871. At that time we had no museum, no art gallery, no park or recreation ground, except the one known as the Norfolk Park, and no free library except our very imposing central one. In a few words I can describe how the Sheffield Corporation gradually acquired what is now of such inestimable value to the people.

In the summer of 1873, owing to the death of Miss Harrison, the owner of the Weston Park, an opportunity occurred to purchase it, and a requisition was presented to the Mayor, requesting him to call a special meeting of the Council to consider the question.

A meeting was held on the 18th July, and I had the honour of moving: "That, in the judgment of this Council,

it is desirable that a public park should be provided by the Council for the use of the inhabitants of the borough."

An attempt was made by an amendment to shelve the question, but it was defeated and the resolution carried.

In due time the resolution bore fruit. The park was acquired upon very reasonable terms.

It was decided on the 2nd April, 1874, that certain additions should be made to the Hall which stood in the Weston Park, and that such alterations should be made as to render it fit for the purposes of a public museum.

I need not say how this was ridiculed and how certain members of the Council assured us that, if we had a building, we should never have anything to put into it. I have no doubt many of the members of this Association have had experiences very much of the same nature. In our case this extended to the libraries as well. There were members who opposed the erection of branch libraries on the same ground, for we were just rousing ourselves up to the necessity of libraries in some of the thickly populated suburbs. To be accurate as to date, I find in the Council minutes that I moved on the 10th June, 1874—"That a petition be presented from this Council to the Lords Commissioners of Her Majesty's Treasury, praying for permission to purchase a plot of land in Highfields as a site for a branch library."

A Museum Committee was not appointed until the 28th July, 1874, so that just a year elapsed between the resolution to purchase the park and the appointment of the Museum Committee. I have had the pleasure of being a member of that committee from that date to this.

We now possess, besides our museums, seven or eight parks, with as many recreation grounds and four branch libraries. This was not all done by magic. It was done by steady persistent work.

A quarter of a century ago our streets were all narrow, no better than lanes—uphill and downhill, and badly paved (even worse than they are now). Our buildings were mean and insignificant. Now we have fine wide streets, fairly level—and handsome buildings—in fact, quite a fine centre to a city formerly most unattractive; and last, but not least, we have a beautiful and convenient Town Hall and a generous, large-hearted Lord Mayor, who places it at our disposal for the holding of our meetings, and invites us to have luncheon there every day.

Of the Museum, of its progress and of the admirable work done by Mr. Howarth during his twenty years' connection with it, I need not speak. The English language is much too tame to describe our excellent curator as I should like to describe him. Still, the majority of you may say—"We are curators; find a man who is not a good curator." And I frankly admit that such a man doesn't exist.

In the first presidential address to this Association, delivered by the Rev. H. H. Higgins, the curator is spoken of as the soul of the Museum; and in a later address from the presidential chair, delivered by Sir William Flower, the same term is used. Soul is a word full of deep meaning, as no doubt all curators are full; but, after all, it is an abstraction, and while the curator may, in this way, be the guiding influence, it is no drawback if he evinces a more corporeal existence. His active brain displays itself in the germination of ideas; and in the practical demonstration of them the less he is an abstraction the more he is a living force, exerting wide-reaching influence for good on the minds of the community. Not being a curator, I may be pardoned for thus trying to analyse him to some extent from the external standpoint, and to express my deep sense of

admiration of the diligent, enthusiastic, and conscientious manner in which he carries out the onerous, but, I should think withal, pleasant duties that belong to his profession.

These annual gatherings are of special value, inasmuch as there is a marked individuality to be found in almost every separate museum, and the opportunity of commingling individual experience for the common good must be of great practical utility. To members of Museum Committees it is scarcely less advantageous to be able to attend these meetings and learn something of the work they take such a large part in administering.

With regard to the work of our *own* Museum, no doubt our much respected curator himself will give us a paper upon that subject.

Before I proceed further I will take this opportunity of turning to a very pleasant subject. That subject is the late Mr. John Newton Mappin's noble bequest of his fine collection of paintings, and of £15,000 for the purpose of building a gallery in which to place them. In the matter of art, you see, fortune smiled upon us. An art collection which might have taken us weary years to get together, even if it had ever been possible to do it at all, which I very much doubt, a lover of art and a lover of Sheffield bequeathed to us. But this was not all. My pleasure is doubled by having to record also the generosity of his nephew, Sir Frederick Thorpe Mappin, the member for Hallamshire, who has added to this fine collection with no sparing hand. He has earned the gratitude of all his fellow-citizens by his magnificent gifts.

There is no doubt we now possess quite a representative collection of modern British art, and also that the value of such a gallery is greatly enhanced by the convenience and suitability of the site chosen for it, as it adjoins the Museum in the Weston Park.

Thus, practically under one roof and in the care of one intelligent head, we have our Museum and our Art Gallery.

The Gallery was opened in 1887, the Jubilee year, by our late highly respected and gifted member, the Right Hon. A. J. Mundella, and the graceful speech made by him on that occasion was one that will not soon be forgotten.

Of the thousands who visit the Art Gallery, I believe there is only a very small minority who fail to admire, or to appreciate, what they see there. Of course, there are some individuals who cannot see, or if they see, they fail to realise what a picture means. A friend of mine once became the envied possessor of a very fine picture by a well-known artist. He is a great lover of art, and counts many treasures among his collection ; but the picture in question was soon his favourite, and he was never tired of admiring it. He considered it of sufficient importance to insure it for £1600. He was a Dissenter, and one day was visited by his minister. Proudly he displayed his picture to his spiritual adviser, and asked his opinion about it. In anxious suspense he watched the thoughtful and penetrating scrutiny of the man whom he so greatly revered as he critically examined it, when, to his dire dismay, the only observation, solemnly uttered, was—"It is a very pretty frame."

But some people who really see a picture do not see it to much greater advantage.

When my son was in the Gallery at The Hague last year, and, with some Oxford friends, was standing near Rembrandt's well-known picture representing a lecture in the dissecting-room, they were suddenly surrounded by a large party of sight-seeing Americans, who were breathlessly "doing" the Hague, to work in Amsterdam before dinner.

They were led by the ubiquitous American belle, who, half a dozen yards in advance, armed with lorgnette and a raucous voice, wheeled rapidly round to face the party and yelled—"Say, pappa, what a fine corpse!"

That was what she saw.

Thirty or forty years ago we had in England, as you all know, very few Corporation Museums, still fewer connected in any way with an art gallery; but I spent most of my time from 1860 to 1866 abroad, chiefly in Germany and other countries of North Europe, and I found there that nearly every town possessed its museum, and it was by no means uncommon—as, for instance, in Berlin, Dresden, Leipzig, Hanover, and Brunswick—to find the art galleries and museums together in one building.

Sir William Flower, five years ago, said with truth—"Of the museums of the United States of America much may be expected. They are starting up in all directions."

Still in many of the States of America they are only now waking up to the necessity of establishing museums as adjuncts to libraries. They are now learning, as Mr. Edward S. Morse says, in speaking of Massachusetts, that a museum seems as much an integral part of the public library as is the experimental part of a lecture on chemistry or physics.

In the *Atlantic Monthly* for 1893 there is a most interesting article by Mr. Morse—"If public libraries, why not public museums?" The whole of the article is so well worth reading, that I am sure you will pardon me for quoting from it. Mr. Morse says:—

"The absence of a public demand for museums in the past has arisen from the methods of public instruction. Lessons from books, and not from nature, have been the tiresome lot of school children. Questions and answers, cut and dried, have tended to deaden the inquiring spirit.

That portion of a child's brain which is involved in observation has been reduced to atrophy by the usual public school methods.

"A distinguished English authority suggests to school boards, high and low, 'that the teaching is out of all proportion in excess of the training, the latter being with difficulty weighed in the scales of school examination.'

"Agassiz said : 'The pupil studies nature in the school-room, and when he goes out of doors he cannot find her.'

"I shall never forget the bitter disappointment I felt as a boy, on my first journey, when the stage driver pointed out to me with his whip the dividing line between the States of Maine and New Hampshire. There was no coloured line ! There was no change in the colour surfaces of the two sides ! I felt grieved and rebellious at the imposition which had been practised upon me.

"Nor can I ever forget the surprise—my delight was distracted by the novelty of my ignorance—when my father, in one of the periodic family drives, chanced to remark, on a shore road near Portland, that the water expanse before us was the Atlantic Ocean. Had he said that one of the islands in sight was Madagascar, I should not have been more astonished.

"Every one can recall experiences of a similar nature, and I venture to believe that these two truthful incidents are pertinent examples of the results of pernicious educational methods universal forty years ago, and by no means uncommon to-day—book-cramming, with no reference to the objects or illustrations in sight from the windows, or within stone's throw of the school door. This undeniable condition of many schools in the land emphasises the necessity of museums where the objects may verify some of the lessons learned at school.

"The book method of education has almost paralysed

public desire for museums, and the result has been that the museum, when instituted, has been in the interest of specialists, and mainly through their efforts. The whole animal kingdom may be epitomised, in a manner, between the covers of a single book; the specimens properly to illustrate such a book would require a good sized hall in which to be displayed."

Since the period of which I was speaking, the number of rate-supported museums established in this country has been very great, as may be seen in the list of museums connected with the various Corporations in the United Kingdom, in that very valuable little book of Mr. Thomas Greenwood's, entitled "Museums and Art Galleries." In looking at that list the progress of this most useful aid to education is at once apparent. How few existed before 1860, yet how numerous they are now!

Who can calculate the immense and far-reaching benefits conferred upon the families of those who pay the rates by this long list of museums?

Another matter which I think I ought to congratulate curators upon is the high appreciation of museums by the public. When we consider that the number of visitors to the Sheffield Museum—taking that as a typical one—is between three and four hundred thousand per annum, a number equal to the population of the city, there is reason to feel great encouragement. The time spent by those who devote it to museum work is well spent.

In the admirable address of Mr. Paton, the President in Glasgow in 1896, after referring to a long list of the necessary duties of a municipal Corporation—namely, the providing for the security of the persons and property of its constituents, the supervision and regulation of the sanitary requirements of the inhabitants, the providing

of water, the construction of sewers, provision of hospitals, and the securing of parks and open spaces for recreation in which the inhabitants may become re-invigorated for their daily toil, he speaks then of what he calls the highest duty, and says—

“The institution, the care and development of museums and art galleries, of libraries, and science and art institutions, I maintain is the noblest work which falls to the lot of any municipality, and it will be a happy day for our cities when the police rates begin to fall, when our prisons become deserted, when our parks, galleries, and libraries rates rise, and when these places swarm with instructed, happy, and appreciative citizens.”

As a proof of the high estimation in which free libraries and museums are held in Sheffield, or as a proof of the confidence of the inhabitants in the wisdom of the committee, it is with great satisfaction that I refer to the fact, that when steps were taken to obtain powers to levy a rate of twopence in the pound for the purposes of the Public Libraries and Museum Act, not a single voice was raised against the proposal.

It was thought after the Mappin Art Gallery had been built that it was desirable to include the maintenance of that institution as well as the Ruskin Museum in the amount which we appropriated for public library and museum purposes; and as we had no special powers, but were limited by the general Act to a penny in the pound, we decided to include an application for power to spend any sum, not exceeding twopence, in the first bill which we should promote. You are, of course, aware that we couldn't apply for this power without proceeding under the Borough Funds Act, sometimes known as Leeman's Act, and one of the provisions of that Act is that a public meeting shall be called, and a vote of the ratepayers taken.

In this case, at a meeting which was convened, it was *unanimously* decided to support the application of the Corporation for the bill containing this provision. We know how very small a party can sometimes raise a great hubbub, and by drumming up a few friends make what would otherwise be a most harmonious gathering into the bear-garden of which we hear so much. But, unfortunately, that is not always the end. If the Corporation is outvoted a poll must be demanded, and, in case of an application like ours, the wards may be stumped, and the cry of economy, which is always so safe and popular, may be raised. We, in Sheffield, have had sad and melancholy proof of this recently, when it became necessary for the Corporation, in their desire to promote a certain bill, to hold a meeting under this Act, and a few discontented individuals opposed it. They made it necessary to demand a poll; thereby causing a needless expense of about £1000 to the city.

I think then, when we consider the power possessed by the ratepayers under the Borough Funds Act, we must highly appreciate and respect the intelligence, the desire for knowledge, and the love for what is ennobling of the ratepayers, or, at least, the friendly restraint exercised by them in not opposing our application.

With regard to museums generally, they all have within them the material for very useful scientific teaching, which can be utilised by those specially engaged in scientific pursuit. But there is no reason why they should be too severely and coldly scientific. Even if they are, it is not impossible to make them distinctly attractive, appealing strongly to the senses as well as the minds of all who visit them. To prove this it is only necessary to point to the index series of cases which fill the recesses in the Great Hall of the Natural History Branch of the British Museum in Cromwell Road. There natural science is demonstrated

in so clear a manner that the student of biology can learn more in one day than he could in a month spent over textbooks. There, also, the non-student cannot fail to have his knowledge increased in a subject interesting to everybody without the slightest intention of studying at all. This is knowledge made easy while remaining absolutely true and reliable. On passing from structure to habits of life—and the habits and structure of every creature which has possessed life must be of interest to every intelligent living being—groups of our native birds are to be seen in the galleries above, almost as if alive in their native haunts. Let any one see these things, and then recall the Natural History Museum as it was in Bloomsbury, and say if the museum idea is not expanding.

As it is in our National Museum, so is it in our provincial museums. They are all awaiting the day when they can rise, so to speak, from Bloomsbury to South Kensington with freer range, extended facilities, and enlarged means of developing their ideas and resources. To some the time has already arrived, as witness the magnificent extensions in Liverpool and the noble buildings being erected in Glasgow.

It is not in the Natural History or Science Museum alone that the public are benefited, for equal gains are to be reaped from the Art Museum. At the head of all stands that wonderful institution at South Kensington, which has done so much to elevate the taste of the public in the things of daily life, not only in the metropolis, but has extended its advantages by systematic and carefully selected loans to all parts of the kingdom.

A great institution like that could scarcely be expected to carry on its work without raising a certain amount of criticism, nor ought it to object to reasonable criticism founded on pure motives and arising from a worthy desire

to improve whatever is defective. The man who can improve on other people's work is always in evidence; but, in these days, it is not difficult to rightly measure the value of his criticism.

The valuable work done by the South Kensington Museum is so vast that one should surely pause in careful inquiry before recklessly assuming superior knowledge as to how it might be better managed. Its purpose has been distinctly to elevate and improve taste in objects associated with the public and domestic life of the people.

That it has done this to a very wide extent all will admit, and that it may have the power to do so still more widely and still more liberally depends chiefly on the means placed at its disposal by a wise Government.

All provincial museums are deeply interested in South Kensington, for they all have the opportunity of sharing in its great treasures. It must, then, be a matter of sincere gratification to all interested in museum work to know that the Government are at length taking steps, on a scale commensurate with the magnitude of the work and the value of the treasures contained in the South Kensington Museum, to give proper scope to its work and adequate exhibition space to its contents.

A home of art so comprehensive deserves a better appellation than a mere local name; and South Kensington Museum in its glorified expansion will not be unworthy of the distinction of bearing the most revered name in the nation when Her Most Gracious Majesty lays the foundation stone of the new building, and confers upon it the further honour of calling it after her own loved name of Victoria.

Now, I suppose, naturally all museums take for their loftiest examples these two great National Museums, and, without attempting in each town a travesty of the British

Museum or the South Kensington Museum, they yet desire to work within their own restricted area on the same lines.

Having dealt thus far with museums generally, it is natural, considering that we meet in Sheffield, that I should refer to one of a special character, which it was intended should be developed here under the personal guidance of Mr. Ruskin.

In a little cottage at Walkley, Mr. Ruskin made his first essay in museum development here, and soon the beautiful treasures that he got together excited a world-wide interest. They soon got beyond the limits of the building for their proper display, and, in contemplating enlargements, Mr. Ruskin laid down on broad lines the general outline of his scheme, which, I think, is worth quoting, as there seems to be some misapprehension in the minds of many people as to his purpose :—

“The immediate additions to the Walkley Museum should, I think, be limited to the erection of a very simple and inexpensive, but entirely strong and comfortable (and, as far as may be, fireproof), building, two-storeyed, and divided in each storey into a ‘gallery’ with a terminal attached ‘room.’ The lower (ground) storey, consisting of the Public Library, with an attached students’ reading-room ; and the upper or second floor, sky-lighted, consisting of the Art Gallery, with attached jewel-room.

“The Public Library would contain the mass of the Museum books, of which all would be chosen for their good contents, and some, further, for curious print, pretty binding and the like, of which the *outsides* (within glass doors), and the most interesting pages of others opened under glass, in flat tables, should be by all visitors visible ; but the *use* of the books granted by special privilege in the attached reading-room to such persons as the future Committee of Management may think proper.

"The Public Library would further contain all such prints, water-colour drawings, maps, &c., as might be by any device or arrangement advantageously exhibited in it, illustrative of history, poetry, and the other higher forms of literature.

"The Public Art Gallery would, in the proposed building, be devoted especially to the illustration of sculpture and its associated craftsmanships in metal work, including fine goldsmiths' and pottery; but such larger pictures as the Museum may, with prudence as to funds, become possessed of, would be easily arranged so as to make the general effect of the gallery more warm and cheerful.

"The attached jewel-room would contain a series, of which the existing collection is a sufficient germ, of crystalline minerals, notable either for their own beauty, or for their uses in the arts illustrated in the greater gallery; and the elements of mineralogical science might be far more practically and pleasantly taught in connection with a series of specimens thus limited, than by the infinitude of a general collection.

"The uses of the Museum itself will be on the whole wide, in proportion to the clearness of elementary arrangement and illustration, in a few subjects of connected study; and will not be forwarded by the extension of imperfect efforts, or the accumulation of miscellaneous objects."

Sheffield would have been rich, indeed, if this scheme could have been carried out under the personal supervision of Mr. Ruskin, but, unfortunately, failing health prevented him from personally proceeding with the work. The collection was finally placed on loan with the Corporation of Sheffield, who can only preserve with tender care the exquisite treasures that Mr. Ruskin had got together; and as a member of the Corporation, I may

be pardoned if I express a pious wish that it may never be disturbed.

I think we shall all be prepared to admit that the value of the Museum depends almost entirely on its personal relation to Mr. Ruskin, and it should, therefore, always be the desire of the committee to keep his idea uppermost in their administration of the Museum.

In conclusion, I sincerely hope that your visit to Sheffield may be one of pleasure to you, and advantage to the museums which you represent.

THE RELATION OF MUSEUMS TO ELEMENTARY TEACHING.

By PROFESSOR A. DENNY, F.L.S., University College, Sheffield.

THE subject, which I propose to deal with in the present paper, is one which certainly cannot lay claim to any novelty, for the question of the development of the educational side of our museums, is one which must have been often raised for discussion at the meetings of the Museums Association. I think we are all agreed upon one point, and that is, that the value of the museum of the future will be gauged not so much by a wealth of objects, as by the mode of treatment and arrangement of the objects, with a view to providing instruction for those who visit it. There must, of course, be much difference of opinion, as to the best methods to be adopted in the development of a museum from this point of view. I wish to merely glance at the question from the point of view of the teachers in elementary schools. These constitute a very numerous class of individuals, who look to museums for all the assistance they can get in the prosecution of an important item in their work, viz., the preparation of object-lessons. The great value of object-lessons in the education of young children is, I believe, undoubted by any who are competent to have an opinion on the subject—for the faculty of observation is strong in early life, and can then be most easily cultivated. The real aim of an object-lesson is to train the eye and the mind to see, and to comprehend.

The methods are of infinitely greater importance to the pupil, than the information given. We must admit, however, that, if the lesson is to succeed, the subject chosen must be one to interest the pupil. The best objects to begin with are those with which the students are most familiar, and of these, perhaps none are more attractive or more instructive than natural objects—especially animals and plants. Almost every child loves nature, but how commonly this nature-instinct is extinguished before the school days come to an end. If we look for the cause of this, I fear we too often find that the teacher is responsible for it. No matter how interesting the nature-study may be in itself, if it is to fulfil its primary function, *i.e.*, the development of the mind, I venture to think that the teacher must have an acquaintance with his subject, extending beyond the information he gets from text-books; and further, he requires to show a certain amount of enthusiasm for the subject. For the last two years I have conducted a teacher's class for the preparation of object-lessons in natural history, and have found how easily this enthusiasm is generated. But all this means that the teacher requires help of a practical nature. He has two difficulties to overcome if he is to succeed in this department of his duties—(1) he must inform himself before attempting to inform his pupils; (2) he must be able to illustrate his lessons by means of real objects. With regard to the first-mentioned problem, he looks for help to the museum, or more rarely to the University College—when such an institution exists in the district. The text-book alone is not enough, for even the best of them fail to be intelligible, as some of us know by experience as teachers only too well. A prospectus of subjects suitable for object-lessons is published in the Education Code, and this comprises chiefly familiar animals and plants. In working

up these subjects the teacher proceeds to the local museum, if there is one. If he finds there merely stuffed animals, skeletons, and undissected specimens in spirit, does he go away much better qualified to give an ideal object-lesson? I fear not. What we want, from an educational point of view, is something in every museum, developed on the lines of the valuable index-collections in the Natural History Museum at South Kensington, with which you are all familiar. I believe we might all make a start in that direction, even if it were on a very small scale. Take such a subject as a bird, for example. In dealing with this, from an object-lesson point of view, I select only the most characteristic features, such as the wing, for special study. Each student prepares a skeleton of the wing, showing the relation of the feathers to the bones. Then a feather is studied microscopically, and, when mastered, the student proceeds to make an enlarged model of a feather. The bird's wing is then compared with that of a bat, and with other types of fore-foot—so that the student becomes familiar with the real nature of the wing, as a fore-leg, specialised and modified as an organ of flight. For teaching purposes I have had some useful specimens prepared in Germany, showing the skeleton on the one side, and the surface of the body on the other side. These preparations may be had at a small cost, and certainly add to the teaching value of a museum from the elementary teacher's point of view. With regard to dissected specimens, I believe the use of artificial colours would often render them more instructive, especially in the case of invertebrates. Even well-dissected preparations may fail to give any clear idea of the relations of the different organs, for immersion in the preservative fluid commonly results in all the regions assuming the same appearance, and a little differentiation, which can be obtained by the

application of colour to the surface of certain organs, would certainly make the preparation more intelligible and more instructive. Preparations illustrating the life-history of numerous types can be obtained from various firms on the Continent; and what could be better from every point of view than the splendid preparations of marine invertebrates, which can be obtained from the Zoological Station at Naples?

Another point of primary importance is the preparation of descriptive labels. These should draw attention to the characteristic features of the object in a clear and concise manner. Many preparations would be rendered more useful by the attachment of small labels to the principal organs, &c. Here again I cannot do better than refer you to the index-collections in the Natural History Museum. In addition to labels, a free use may, with advantage, be made of drawings or other pictorial illustrations, to serve as a supplement to the specimens. Such illustrations may be placed inside the cases, as is commonly done, or in museums with adequate space, much larger diagrams may be used. In the Berlin Museum, I noticed that Leuckart's zoological diagrams were hung about to illustrate the different classes of animals.

May I say a word or two concerning the second difficulty the teacher has to contend with, *i.e.*, the illustration of object-lessons in school. This point does not, perhaps, concern the Museums Association so directly, but it is worth glancing at. Although the importance of the object-lesson as a constituent of the elementary school curriculum appears to be generally admitted, yet the school authorities rarely make any provision for giving the teachers any assistance in the matter. They have, in the majority of cases, to prepare or purchase at their own cost the necessary specimens. Here in Sheffield, Mr. Howarth, the Museum

Committee, and the Teachers' Guild have devised a scheme which is worthy of imitation elsewhere. A useful series of cabinets of teaching specimens has been arranged under the superintendence of Mr. Howarth, and these are (subject to certain conditions, which I need not enter into here) allowed to circulate among the schools. The teachers who have the privilege of borrowing these cabinets find them of the greatest value, and are, I happen to know, much envied by those who are not so fortunate. The cost of cabinet and its contents is very small, and, considering its value to the teachers in the elementary schools, I would venture to suggest, that a few pounds spent occasionally in this way by the School Boards would be money very well spent. I know, from my intercourse with the teachers, how urgently some assistance of this kind is needed, and how much it would be appreciated. My excuse for bringing this matter up now is that any support it might receive from this Association would doubtless have weight with School Boards, whose attention may be drawn to the subject, and especially would this be so if other museums were prepared to give the same help in the matter as the Sheffield Museum has done.

There is still one other point to consider in connection with this question of museums and elementary teaching. In my opinion even a well-equipped educational museum will probably fail to give the teacher that familiarity with his subject, which is necessary, if he is to give a successful lesson. I believe that some training of a practical nature is desirable, and, in fact, necessary for this. In towns which have their University College, this can be done without difficulty by the arrangement of a laboratory course of instruction. But I should like to ask if it is possible for the museum to give any assistance in such work in places which have no other facilities for doing it?

One could not expect the curator to undertake such extraneous work, except in special cases. An experienced teacher, who has gone through a practical course of instruction, could do the work of training others if he had a workroom and necessary accessories, such as museum preparations, &c. I have had several teachers in my class, who could certainly undertake such work, and do it well. I am well aware what a valuable thing space is in most museums ; but, wherever it is possible, a room ought to be set apart for the delivery of occasional museum lectures and demonstrations. Such a room might also be used for practical classes. Perhaps this suggestion is impracticable at present, but it may be worth considering. In conclusion, may I point out, that I have been prompted to bring this subject before you by remarks that are constantly being made to me by the teachers themselves, so that the difficulties raised are not of my own creation.

A PEOPLE'S PALACE.

BY JAMES PATON, F.L.S., Superintendent of Museums, Glasgow.

THE difficulties encountered by the novelist in the conception, construction, and conducting of a "Palace of the People" are entirely different from those which have to be faced by the men who elect to build a palace of stone, steel, and glass, and to carry out their undertaking at the expense of ratepayers for the benefit of living men. When Sir Walter Besant erected his imaginary "Palace of Delight," and gave that airy nothing "a local habitation and a name," he had the Messenger "millions" at his beck and call; he had simply to wave his wizard wand and the walls rose at his command: he could with the utmost ease suppress all troublesome critics, and he could fill his concert-room, his theatre, his dancing hall, his library, and his workrooms, with crowds of happy and contented human beings, eager to enjoy all rational delights, not one of whom ever thought of writing a letter "to the editor."

The functions of the prosaic practical builder are different, his view is more circumscribed, and his powers are incalculably more limited. For the novelist's conception I must refer you to "All Sorts and Conditions of Men": like all Sir Walter Besant's books, a most delightful work, and one which has been fertile of much social enlightenment and quickening. My task shall be to lay before you the various steps by which a People's Palace has

been evolved in Glasgow, the difficulties the institution encountered in its conception, the slow stages through which it came to take actual form and consistence, the troubles of its infant days, and the measure of success which, to the present time, it has achieved.

I almost regret to say that the credit, such as it is, of suggesting the Glasgow People's Palace cannot be offered to Sir Walter Besant and his novel. It arose rather out of various concurring local circumstances and events, though in the end, the Stepney Palace of Delight may have been an almost unconscious factor in giving the institution its final shape. As I said to you in my Glasgow Address, the Museums and Art Galleries Committee of the Corporation had for many years been in the habit of forming occasional special exhibitions of art and of the art industries of various countries and periods. These at first were held in the Corporation Art Galleries in Sauchiehall Street; but Glasgow is a big city, and a desire was expressed that districts other than the favoured west-end should share in the advantages of such exhibitions. Early in 1883 an opportunity occurred of organising in the east-end of the city a small exhibition as a first experiment in district shows. A hall of modest dimensions, connected with the Eastern District Police Buildings, was placed at the disposal of the committee, and therein was displayed a small collection of pictures obtained on loan from local gentlemen, several cases taken from Kelvingrove Museum and the Corporation Galleries, and two cases of art objects lent from the South Kensington Museum. The hall was in no way convenient or attractive, and it might be thought that the contiguity of the police office and court-room would deter some persons, greatly in need of the elevating influence of art, from freely visiting the collection. Notwithstanding these

circumstances, during the fifty-six days, from 20th February till 24th April, over which the exhibition extended, it was visited by no fewer than 63,585 persons.

Encouraged by this manifest success, the committee in the following year—1884—organised, on a much larger scale, an exhibition in the southern district of the city, in two large saloons, also the property of the police, which, however, were erected in connection with a range of public baths and washing-houses, then newly opened. On this occasion the help of a local committee was obtained. One saloon was devoted to the illustration of local industries and to ingenious devices by working men. The upper and more important saloon was occupied principally with a collection of art objects and pictures, embracing a series of historical water-colours from South Kensington Museum. That exhibition continued from Christmas, 1884, till the end of March, 1885, during which period it was visited by 153,166 persons, among whom upwards of 6000 copies of a penny guide-book were sold. As said at the time, “the success of the undertaking affords encouraging testimony to the good results which may be produced by the novelty of occasional exhibitions, on a moderate scale, set down in the midst of densely packed populations.” This first south-side exhibition was followed by a series of others, all of which attained equal popularity and success.

Again, in the year 1891, it was the desire of the committee to give the east-end the benefit of a second temporary exhibition, and exhaustive inquiries were instituted with the view of securing a suitable and sufficient hall. In this search, however, the committee were unsuccessful, and they were obliged to report to the Corporation that no fit and convenient accommodation could be secured for their purposes. Thereupon a special committee was appointed to take into consideration the possibility of erecting in the

eastern district a building which might be suitable for exhibitional and cognate uses, and to report as to funds which might be impounded for such an erection. It happened that there was, at that time, at the disposal of the Corporation in several of its trusts a sum of about £22,000, most of which was more or less closely related to the east-end of the city, and applicable for purposes of that district.

And now began the difficulties of the special committee appointed to consider the question of providing a hall, galleries, and recreation rooms for the east-end of the city. They had to determine first, what was to be the scope and limits of the proposed building ; second, where it should be erected ; third, the amount to be expended on the institution ; and fourth, whence the funds were to be derived. Definite views on these various points had first to be formulated ; these had to be submitted to criticism, discussion, and modification ; and a general reconciliation of divergent opinion had to be secured before the plans were ready to submit to builders. Inevitable delays occurred, plans almost without number were submitted and withdrawn, and numerous sites were canvassed. The delays and discussions were advantageous to the undertaking, for, as time passed, the ideas of the committee grew and expanded ; and whilst in the early stages of the discussion from £7,000 to £8,000 was supposed to be a reasonable limit of expenditure, the committee at last, in June, 1894, boldly resolved to place before the Town Council for approval, plans which involved an expenditure not exceeding £20,000, with an estimated annual charge for maintenance of about £600. The actual capital expenditure, it may be remarked, has not yet been made up, but it is certain the total will come much nearer to £30,000 than to the £20,000 originally estimated. As I shall show

you also, the rate of annual expenditure is, for the present, much in excess of the original modest sum suggested to the Town Council.

These plans and estimates received the approval of the Town Council on 5th July, 1894, and thereupon the City Engineer was instructed to proceed with his working drawings, and to obtain tenders for the necessary works. As passed by the Town Council, the plans showed "the arrangements of a combined structure which in one part affords accommodation for a Museum and Art Gallery, and, in the other, provides a spacious area which can be utilised alternatively for the display of flowers and sub-tropical plants, or for popular musical entertainments, or for other purposes of assemblage—the available floor space being sufficient to give standing room for over 3000 persons. The Art Gallery is placed within a lofty building, three storeys in height, designed in the style of Italian Renaissance. The frontage measures 120 feet, and the depth of the building is 43 feet. The entrance, through a triple archway, gives access to the staircase leading to the Museum on the first floor, and also to doorways which communicate with the Winter Garden. On either side of the staircase is a large room available for recreation, occasional exhibitions, or administrative use. The Museum floorage extends over the whole length of the building without sub-division, and is abundantly lit from three sides. The Art Gallery, on the upper floor, is reached by two stairways, one at either end of the building. The floorage is uninterrupted by partitions, and occupies the whole interior. Very ample provision is made for the display of pictures and other objects of art. The adjoined Winter Garden is a large structure of iron and glass, 180 feet long and 120 feet in width. The interior is laid out so as to be available as a promenade, as well as a place for the

exhibition of flora and general collections. The exterior of the garder presents a pleasing outline the curves of the roof being tastefully designed to harmonise with the Art Gallery and Museum. There are three separate entrances to the Winter Garden, a gallery in the two communicating with the main building.

The question of the site being thus disposed of, the selection of a site was again made to bar the way of actual building. The final result is a prolonged struggle under this head to a plan at a General meeting on 4th April 1895, and the site in Queen's Street being thus definitely settled, the building was actually begun after nearly four years' deliberation and discussion.

Glasgow Green is a park or meadow at this moment measuring about 150 acres over the once pellucid waters of the Clyde flowing along its south-east boundary. It may be regarded as the central park of the city, and on every side it is surrounded with a dense population. The Green is esteemed as peculiarly the birthright and property of the people of the city, and every one watches over it with a jealous care which is almost savage in its manifestations. By use and wont rights and privileges have been established on the Green—sacred in the eyes of their possessors as they are still from the legal point of view—and the mere moving of a chair or chair from one side of a railing to another has been known to occasion almost a riot. The Green is the theatre of the ascendancy, although it cannot be said the followers of its sway spend their time in hearing what is said there. There the fervid Orangeman denounces a traitor, the Duke and all his doings, and mightily he goes over and over in print against his Romanist antagonist; the other argument of the well-thumbed "Hannoverian Chartist"; there the blatant atheist with new books over the enthusiastic but simple-minded

soldier of the Salvation Army ; there the fiery radical pours withering scorn on the present Government ; there the indignant but long-suffering ratepayer—who probably dwells in a municipal lodging-house and who pays no local rates, but who contributes liberally to Her Majesty's excise revenue—denounces the blood-sucking Town Council ; there the pure-minded teetotaler rails fiercely against the whisky shop ; there every faddist, every crank, and every quack finds a stand and an audience. The Green arena is a marvellous and valuable institution, giving free course and comparatively harmless outlet to sentiment and opinions which otherwise might sometimes attain explosive force. It is a safety valve which should find a place in every great community. Had the People's Palace not been so named, it is more than likely that its planting within the sacred area would have been resisted by the people.

The delays which appear to be inseparable from all building, except that of the jerry-house, retarded the completion of the structure till New Year of 1898, and even then, if a bull may be permitted, it was not finished. But the work was sufficiently advanced to enable preparations to be made for the opening of the Museum and Art Gallery section, and to permit of a certain amount of floral wealth to be displayed in the conservatory. On the 1st October, 1897, a sub-committee which had been appointed to deal with the arrangements for equipping and opening the Museum and Art Gallery portion of the institution reported as follows :—"As it is desirable that a distinctive and permanent name should be given to the institution—now nearly complete—which has hitherto been known as hall, gallery, and recreation rooms for the east-end of the city, the sub-committee resolved to suggest that the building should in future be known as 'The People's Palace.'

"The Museum portion, being under the supervision of this sub-committee, should be officially regarded as a branch or section of the Museums and Art Galleries of the Corporation, and should be designated 'Corporation Museums and Art Galleries, Glasgow Green Branch.'

"For efficiency and economy of working, as well as for the full utilisation of the art treasures and museum objects acquired by or presented to the city, it is desirable to regard all the sectional or district museums as branches of one institution, and specimens should, as far as possible, be acquired without any limitation to the control of the Corporation as to where and under what conditions they may be made useful to the public.

"The Museum portion of the building consists of three floors. As planned originally, the ground floor was set off for a reading room on the one side and a recreation room on the other. The first floor was to be devoted to the purposes of a museum, and the upper floor—roof-lighted—was set apart for pictures and sculpture.

"The question of permanent arrangements and allocation of space may be left for future consideration. In the meantime, it is necessary only to consider the most desirable scheme for floating the institution into success, public favour, and usefulness.

"For the inauguration of the institution, it is desirable to enlist the sympathies and co-operation of the public generally, and especially the residents in the district. With that view it is suggested that a strong representative committee be formed for the purpose of acting as an auxiliary to this sub-committee in organising a local exhibition, which shall comprise an industrial and a fine art section. For the purposes of the industrial loan exhibition the ground and the first floor should be reserved, leaving the galleries on the upper floor for the exhibition

of modern pictures, sculpture, and other art objects. The industrial department would resolve itself into an Arts and Crafts Exhibition of and for the east of Glasgow, in which such triumphs of decorative resource, of craftsmanship, of ingenuity, and of inventive skill, as can be produced specially in the east of Glasgow, would find their proper place. It is desirable that a high standard of excellence should be insisted on, so that not only would it be a real honour for an exhibitor to have his productions accepted and shown, but also that the collection may have a due educative and elevating influence on visitors.

"In forming the loan collection of pictures, it might be proper to limit the pictures to modern works of the British School. It must not be forgotten that, in this department, the loan collection will be only the first of a practically endless series, and it is most desirable for the value and interest of such exhibitions themselves, as well as for the sake of working out some harmonious plan, to have a definite aim, and set limits for each exhibition. The people can be best instructed by starting from the art of their own times and of their own country, and thence working outwards and backwards. Therefore it is that an exhibition of British and of recent works is sure to be most popular and acceptable. But the aim of the art exhibition should be exalted, and only works which have made a name and a well-merited enduring reputation should be accepted. Of such there are abundance, and in obtaining loans for this section it will not be necessary to confine the selection to local lenders."

While the work of collecting and repairing was going on quietly but successfully, a storm of public excitement and controversy arose in connection with the opening, which, while it in no way affected the fortunes of the institution, appeared to stir public sentiment with peculiar violence.

The regulations under which it was proposed the Palace was to open, as submitted to the Town Council, contained a recommendation that the Museum and Art Gallery should be open daily from 11 till 4 and from 7 till 10. It was further proposed that the conservatory should be open to the public on Sundays. An amendment was submitted to the Council to the effect that the whole institution, Museum and Art Gallery, as well as conservatory, should be open every Sunday not less than three hours. The matter was perceived to be one of too great importance to be disposed of by a side issue, and the amendment was withdrawn, its proposer giving notice of a distinct motion in favour of Sunday opening. Thereupon the storm broke out in the columns of the newspapers, and organisations of various kinds, religious and otherwise, took up the question with great noise and clamour. When the motion came to be discussed, two deputations, the most formidable which ever appeared in the Council Hall, presented themselves to champion their respective sides. In the end the motion was defeated by a majority of 44 against 18. On the question I have never expressed any opinion, and I do not intend here to depart from that position. It is a point for the public to settle, not for museum curators. But, without injuring or offending either side, I may remark that it was not the opening of the People's Palace which was exciting the public. Of those who fervidly urged the Sunday opening, very few probably would visit the institution on either Sunday or on any other day. There is no unquenchable eagerness on the part of the general public to get into museums. On the other hand, many of those who urged the sanctity of the Sabbath might have passed through the People's Palace or a similar place on a Sunday afternoon without feeling they had committed a deadly sin. The fight was, in fact, between the representatives of the

Sunday Society on the one side, and the adherents of the Sabbath Protection Society on the other. No sooner was the decision of the Council given than all parties subsided into their accustomed calm.

To return from this episode. The efforts of the committee to obtain loans and other support for their inaugural exhibition were heartily seconded by public bodies and private owners, and it is with gratification I am able to say that from no outside community was more cordial and generous support obtained than from this good city of Sheffield. Through the influence of our enthusiastic President, and with the aid of our indefatigable Secretary, a really beautiful and extensive collection of art metal work was obtained from the Arts and Crafts Guild of Sheffield, besides a number of important and valuable modern pictures. Among other lenders was Her Majesty the Queen, who ought to have been first named; the Earl of Rosebery, the Corporations of Dundee, Birmingham, and Bradford, and the Arts and Crafts Society of Ireland. The collections were duly received and arranged, a catalogue with brief biographies of artists represented in the exhibition was prepared and printed, and everything was ready for the formal inauguration of the institution by the middle of January. On the afternoon of Saturday, the 22nd January, the People's Palace was declared open, free and for ever, by Lord Rosebery, who delivered on the occasion a most appropriate, thoughtful, and suggestive address.

From the very first, and especially at the first, the popularity of the institution was simply overpowering. The visitors, during the few hours on which the Palace was open to the public on the first evening, numbered 11,545. During the following week the institution was visited by no fewer than 67,420. Within seven weeks the

number of visitors amounted to more than a quarter of a million, and up till the end of June the total reached 510,000 persons. Of the penny catalogue which, I regret to say, was sold at a loss to the Corporation of Glasgow, 42,000 copies were disposed of within four months. Of the behaviour of this vast crowd, little complaint falls to be recorded. Of malicious injury there was scarcely a trace, and though a large proportion of the visitors were not of the class which ordinarily visit museums, the orderly conduct was most praiseworthy.

As to the demeanour of the visitors, the following notes have been supplied to me by Mr. G. W. Ord, the curator in charge:—"The enormous crush of visitors in the months of January and February was no doubt largely due to curiosity, the place having been very well advertised by the Sunday opening agitation, but this is not a sufficient explanation of the great popularity the institution still enjoys. When the sale of the catalogue was stopped at the end of May, owing to changes in the exhibits, we were still selling an average of 800 a week, and we can yet see in the hands of visitors well-thumbed yellow-covered catalogues, such as we were selling in the beginning of February. The true secret of this popularity lies, I think, not so much in the exhibits, as in the general appearance and arrangement of the building, partly also in its supplying a meeting-place—clean, pleasant, and well-lighted—for the people of the east-end of the city, not the least of the wants of that locality. Of all the departments, the picture galleries were unquestionably the most popular, and during the first three months special arrangements had to be made in the evenings to prevent overcrowding in that part of the building. As might have been expected, the picture with a story was the great draw, landscape, unless containing figures of animals, being usually passed over with but slight

attention. Round such paintings as E. Radford's 'Weary,' J. Hamilton's 'Massacre of Glencoe,' Hugh Cameron's 'Funeral of a little Girl on the Riviera,' Robert Herdman's 'Abdication of Mary, Queen of Scots,' and others of a like nature, the people always massed, and considerable difficulty was experienced in keeping them moving round. A number of pictures of Old Glasgow, notably Sam Bough's 'Garngadhill' and John Knox's 'Trongate,' aroused great interest, especially in the older section of the visitors. Of the arts and crafts exhibits, wood-carvings, books, and metal-work appeared to appeal more to the people than pottery, glass, or textiles, but even these cannot be said to have received the same minute and careful inspection as the few mechanical models in the artisan section. It is, however, very difficult to say what kind of exhibit is likely to interest any given class of visitor. Between the members of the 'black squad' and Irish laces and embroideries there would seem to be very little in common, and yet a crowd of riveters stood round the case containing these exhibits for a full half-hour on one occasion discussing the comparative 'niceness' of each, and the amount of work that each had entailed. Taking all things into consideration, the visitors were exceedingly well conducted, and beyond the taking away of a few tickets and labels no damage has been done. At first, the spitting habit, so characteristic of an east-end multitude, gave us a good deal of trouble; but the posting of a few bills and a little firmness on the part of the attendants soon produced a good effect, and it is now, as far as we are concerned, almost completely eradicated. A tendency to shouting among the younger part of the visitors had also to be put down, but, with very few exceptions, the admonitions of the attendants were taken in good part, and we have found that the stretching of a piece of string across any portion

of the rooms is quite sufficient to keep the people out of the part marked off."

The conservatory section of the People's Palace is under distinct management ; but to some of its experiences brief allusion may be made. From the first, it was arranged that during the winter season, orchestral promenade concerts should be given free in that section twice a week, on Tuesday evenings and Saturday afternoons. Chairs to seat 600 persons were provided, and the remainder of the audience had to stand or move about as best they could. There was further interpolated a series of vocal and choral concerts on Thursday evenings, also free. The patrons of these concerts did not behave with the rigid reserve which characterises the audience at a classical concert, and the vocalists especially had some reason to complain of the boisterous demonstrativeness of the youthful portion of the audience. Notwithstanding the attendance of a formidable array of police constables, little could be done in a densely packed crowd in the way of maintaining order and quiet, and to check the evil it was proposed that admission should be given by printed programme, for which a penny should be charged. The proposal was received with manifest disfavour : the people had tasted the delights of a free concert, and free they must continue. And so free they did continue till, for a Thursday evening, a concert by amateur negro minstrels was announced. The attractions of burnt cork, calico trousers, paper collars, and corner-men were too overpowering. The conservatory was densely packed, and surging thousands still besieged the doors. The din of the excited multitude was like a torrent, and like a torrent it could not be stemmed. The performers appeared, but the concert has not yet begun. The noisy spirits swarmed over the platform, and the piano, which had been taken out on the hire system, was in

danger of being returned by the instalment method. Such was the end of the vocal concerts, and after a few more quite orderly band performances, the musical entertainments ended for the season.

The conservatory was designed not only for the exhibition of growing plants, but also for musical entertainments, and it is obvious that the rival claims of horticulture and music yet remain to be adjusted. The lovers of music claim that their art is much more popular and acceptable than horticulture, a specious but fallacious argument. If the desires of the multitude are to rule the municipality in the exhibitions and entertainments to be provided, something much more spicy than even nigger minstrelsy would have to be purveyed, and shows would not be confined to high-class modern pictures and art productions. The line must be drawn at something a little above and a little better than the average taste, if any good is to be accomplished, if any refining influence is to be exerted. The fact is, that the cultivation of music, and of rare and valuable plants within the same area is, to a considerable extent, mutually incompatible. Scotch people occasionally get fair amusement but dubious instruction from the comments of persons whose misfortune it is not to have been born in their favoured land. I have seen it gravely stated that an article of furniture, common in northern households, is employed as a sofa in the evening, a bed during the night, a breakfast table in the morning, and a wardrobe during the day. It has not been my fortune to see this marvellous *multum in parvo*, but there is little difficulty in believing that it must prove a very indifferent sofa, an uneasy bed, an uncomfortable table, and an unhandy wardrobe. So it is with a combined concert-hall and conservatory. The plants interfere with the music, and crowds seated listening to a concert injure

the plants. To listen to the occasional strains of a band while wandering round feasting the eyes on the glories of leaf and flower is a delightful and quite realisable condition ; but a set and seated concert—no !

Such is one of the difficulties of the situation. There are others pertinent to the museum and art gallery side. It is evident that the ordinary museum installation will not satisfy the requirements of an institution meant more for popular enjoyment than for instruction and elevation. We need not blink the fact that to the crowd a museum is a very dull place, and that a visit to it or even to a picture gallery does good only in the same mysterious way that attendance at a church service benefits many persons—by making them uncomfortable. But let us take courage from the thought that we suffer in good company. Churches are voted dull, so are schools and colleges : instruction generally is looked on as irksome and laborious, and yet, if a man is to be elevated, he must climb, which means exertion. But a People's Palace would defeat its own object were its aim too lofty, sober, and serious. We must not seek too much to instruct the people, but to attract them—to interest them—and in so doing to insensibly refine and elevate their tastes. Put before them pictures, although you are certain that it will not be the really fine works which will first attract their attention. We have all, high and low, to undergo a process of education in taste, and appreciation will grow with opportunity for observation. Frequent changes of objects on exhibition and new attractions are indispensable conditions of the carrying on of the People's Palace. This the Glasgow Corporation has recognised by founding the institution with loan collections, and by sanctioning a scheme under which, from year to year, special exhibitions of certain definite branches of art work shall be formed, in connection

with which prizes and awards for artistic skill are to be given. For the ensuing winter season it has been arranged that there shall be a special exhibition of wood-carving and ornamentation, and prizes of £5, £3, and £2 are offered for specimens of wood-carving sent in for competition, and adjudged, first, second, and third in merit respectively. In addition, certificates of merit will also be granted in accordance with the decision of the adjudicators appointed by the Corporation.

But in a building of very considerable exhibitional capacity, the maintenance of loan collections and the frequent renewal of attractions are very onerous tasks, involving serious outlays. The area from which loans can be drawn is restricted ; the number and the resources of lenders are also limited and constantly decreasing. Nobody knows how easy it is to offend some lenders till he has tried to please them. The lender is indeed a human being like ourselves, touched with all our infirmities ; his motives are as mixed as those of average humanity. A few you find are among the most generous men who breathe : appreciating their possessions, they desire to share their enjoyment with their fellow-creatures ; some there are who are very proud and jealous of their treasures; and these they give you only under conditions and restrictions which make the borrowing both troublesome and expensive ; some lend from motives of personal vanity, and to these an angel from heaven would give offence ; some, of the baser sort, possess works of doubtful character and reputation, which they desire to lend, so that by association with respectable company they may rise in the estimation of others, and thus acquire increased pecuniary value. The latter are always very willing to lend, and to have their property insured for large sums ; but it is a meritorious deed to offend such. Dealing with all classes of lenders, resources and patience become

exhausted, offence is given, and thereby supplies are cut off—and so the difficulty of keeping up loan collections grows in geometrical ratio.

And this frequent borrowing and replacing also involves a very serious expenditure. For the safety of all property lent, the most ample provision must be made; but some lenders insist on conditions involving needless expense, which, however, must be borne with a cheerful countenance. The insurance, carriage, and handling of loans necessitate heavy and often-recurring expenditure, so that a People's Palace is maintained neither without difficulty nor cost. The wages and the lighting bills, in the case of the Glasgow institution, have been materially increased by keeping the building open the entire day from 11 till 10, instead of shutting from 4 till 7, as originally proposed. No permanent institution that I know offers such full facilities for visitors; but it must be recognised as a great convenience, that what is, or may be, practically a club for the toilers stands at all reasonable hours ever ready to receive and welcome them. No accurate forecast of the annual expenditure can yet be given, but I anticipate that, continued on the present basis and with the same aims, the annual budget of the People's Palace will certainly exceed £1,200. This leaves out of account the cost of maintenance of the conservatory section, and the amount to be expended in providing free music, which may be great or small, according to the desires of the people and the decree of the Corporation.

THE ARRANGEMENT OF HERBARIA.

By E. M. HOLMES, F.L.S., Curator of the Museums of the Pharmaceutical Society of Great Britain.

EVERY botanist who is in the habit of working in a Herbarium will, I think, agree with me that there is a possibility of improvement in the arrangement of specimens so as to economise the time at the disposal of the visitor as well as of the curator.

At present each country has its own method of classification of plants, and is patriotically inclined to follow the lead of its chief systematic botanist. Museums, even in the same country, however, do not always follow the same arrangement. The result of this is that the visitor has in each case to learn the arrangement followed in that particular Herbarium before he can find the plant he seeks, or he must tax the time and good nature of the curator by asking him to find it. In either case it is obvious that the simpler the arrangements that can be devised, and the less the time occupied in searching for the plant, the greater the advantage.

Before discussing the methods usually employed, it will be well to define what the objects of a Herbarium are.

In large or national Herbaria, the principal object is to have in the collection every known species of plant, so that travellers, curators of botanical gardens, horticulturists, systematic botanists, and others, may be able to identify any unnamed plant, or, if unknown, may be able to describe it. Other objects are—(1) to afford a knowledge of the

distribution of plants in different countries, (2) of the variation of species, and (3) the preparation of Floras.

But on the other hand, it is decidedly not the object of a Herbarium to teach botany, or to indicate the affinities of plants. This is recognised in the excellent arrangements now being made in the Natural History Museum at South Kensington, where a bird's eye view of the vegetable kingdom can be obtained in the Botanical Museum adjoining the Herbarium, and the affinities of plants can be more easily grasped by the public by means of a carefully selected series of specimens. That a Herbarium is not intended for teaching purposes is also obvious from the fact that it is, as a rule, shut off from the general public. Excluding, therefore, these two ideas, the Herbarium resolves itself into a collection of plants so arranged as to allow of easy reference to any given plant in as short a space of time as possible; or, as one of our leading botanists writes, "What one wants is simplicity and an arrangement for rapid consultation"; or, as a French authority remarks, "A Herbarium is, in fact, a dictionary of plants, and the arrangement that permits of finding a plant in it as promptly as possible is the best."

The arrangements that are adopted in different Herbaria naturally vary according to the uses to which the particular Herbarium is put.

In a large or Imperial Herbarium, which is constantly consulted by those engaged in preparing Floras of different countries, it is obvious that a geographical arrangement, carried out as far as possible without affecting the use of the Herbarium for other purposes, will be a most useful one. In a Colonial Herbarium it is equally obvious that a separate collection containing all the known plants of that colony will be a necessity, as it will save an enormous amount of time. In a small provincial Herbarium, a

separate British collection, and a local collection representing the district or county, will also be acceptable, and will save the time of both visitors and students.

As a rule, therefore, a Herbarium may contain several special collections besides the general one.

The first difficulty that confronts the visitor to a Herbarium is to find out how the natural orders are arranged in the different collections. No uniform plan appears to be adopted in Herbaria; even those in the same country differ in various details. For the arrangement of the natural orders of plants there are four principal methods employed:—(1) The natural orders are arranged according to Bentham and Hooker's *Genera Plantarum*, e.g., Kew, British Museum, Edinburgh, Glasgow, Oxford, and Cambridge; (2) the natural orders are arranged according to Engler and Prantl's *Natürlichen Pflanzen-Familien*, e.g., Germany, Austria, Switzerland; (3) the natural orders are arranged alphabetically under Dicotyledons, Monocotyledons, and Acotyledons, e.g., Marseilles; or in small collections, alphabetically throughout, e.g., Pharmaceutical Museum, London; (4) the natural orders and genera are arranged like books in a library, the cabinets being numbered and the shelves lettered, and an alphabetical index kept with corresponding letters and numbers (Durand's Index being used), e.g., Trinity College, Dublin. The result is, that a visitor to Kew from the Berlin Herbarium, or a visitor to Berlin from the Kew Herbarium, will have to consult the book that is followed before he can find any one of the 200 natural orders of flowering plants. Even if the Herbaria were all arranged according to either Bentham and Hooker or according to Engler and Prantl, the visitor is hardly likely to remember the exact position of the natural orders, and would have to walk perhaps to the other end of a large building for the book before he could find the cabinet he seeks. This loss

of time might be easily prevented by having the cabinets numbered consecutively from left to right, and on each floor an alphabetical list of the natural orders which are situated on that floor, the number of the cabinet containing the order being placed against its name on the list.

The second difficulty that meets the visitor is to find out where the genus he seeks is placed under the natural order. The arrangement followed in this country in our principal Herbaria is that of Bentham and Hooker's *Genera Plantarum*, or of Durand's Index to it; and this arrangement formerly obtained in some of the large continental Herbaria, but since the publication of Engler and Prantl's *Natürlichen Pflanzen-Familien* the arrangement of that work has been followed in Germany, Austria, and Switzerland. As Engler and Prantl have in many cases reversed the order of the genera adopted in the *Genera Plantarum*, or otherwise altered their sequence, the inconvenience and waste of time in searching for a genus in the Herbarium of one country by a visitor from another is obvious. The only method that suggests itself of minimising this waste of time is to hang outside the cabinet where each natural order begins an alphabetical list of the genera contained in that order, with the number of their sequence placed against each.

The third and greatest difficulty that besets the visitor to the Herbarium is to find the particular species he wishes to see. Almost every Herbarium contains a number of new species that have been published since the last Flora or monograph was issued, as well as a number of others evidently or probably new, but which it is impossible to name accurately on account of the material being imperfect; so that a special arrangement has to be made for these. The principal methods of arrangement of species that are in use are as follows:—

1. *The Geographical method.*—In this the species are arranged according to definite regions of the globe, such sections being placed either in covers of definite colours, or labels of different colours are attached to the ordinary stiff brown-paper covers. Thus in the Kew Herbarium printed labels of the following colours are used and numbered as follows :—

Yellow, 1-3—(1) Europe; (2) North Africa and Orient;
(3) North Asia.

Green, 4-6—(4) China and Japan; (5) India; (6) Malaya.

Buff, 7-9—(7) Australia; (8) New Zealand; (9) Polynesia.

Grey, 10-12—(10) Tropical Africa; (11) Mascarene Islands;
(12) South Africa.

Pink, 13-18—(13) North America; (14) Central America;
(15) West Indies; (16) East Tropical South America;
(17) West Tropical South America; (18) Temperate
South America.

Printed cards showing this arrangement are hung up in the Herbarium at Kew, and prove a great convenience. In the Oxford Herbarium, African species are placed in orange, American in green, Asiatic in pink, and Australian and Oceanic in yellow covers.

2. *The Natural Sequence method.*—For this purpose De Candolle's *Prodromus* is generally employed, but as there have been many new species added since that work was published, the most recent monograph is generally followed, where one exists, and the new species are placed either in a separate cover at the end of the genus, or intercalated where they seem most nearly allied.

3. *The Natural Sequence, Geographical, and Special Flora method.*—By this method the species are, in the first place, arranged geographically, and in the second place, according to the best published Flora of each region. This method is very convenient for some purposes, but fails when it happens that a plant considered as native in one

country is subsequently discovered in a distant region. Under this method, also, recently published new species have to be relegated to the end of the genus, and arranged alphabetically in a separate cover.

4. *The Library method.*—By this method the species are arranged according to De Candolle's *Prodromus*, and subsequent species are placed alphabetically in a separate cover at the end of the genus. This plan, like the last, of course, does not economise time in finding the species.

5. *The Alphabetical method.*—The species are placed alphabetically throughout, even in large genera. In an alphabetical arrangement a definite standard for the names of species is necessary, and for this purpose the *Index Kewensis*, and Durand's continuation of it up to the year 1895, might be used. Where the names in the *Index Kewensis* have been shown in published papers to be incorrect, they should be altered in that work, which would then remain the standard. The drawback of the alphabetical system is that nearly allied species often become widely separated; but as the Herbarium is not intended to teach the affinities of plants, and there is little time lost in getting out the specimens and replacing them, the inconvenience is not so great in practice as it appears. The only safe way of naming a plant is to examine its structure first. The lazy method of guessing at the genus without dissection of the flowers and fruit, and comparing it with the group in the genus nearly resembling the plant, often occupies much more time in the long run than the careful examination of the flower and the reference to the alphabetically arranged but widely separated specimens would take. The advantages of this system are—(1) that there is no necessity for separate covers for new plants, since they can be at once distributed into their alphabetical position; (2) that there is no need for reference to books

or to curators to find the specimen needed, and there is no difficulty in knowing where to replace the specimens, since any one can put the plants back in alphabetical order. When following a book, for instance the *London Catalogue of British Plants*, every time a new plant catalogue comes out, the number and place of the plants have to be changed. But by following the alphabetical plan no alteration is necessary, but only a cross-reference to any new names, which is easily made.

Personally, I am in favour of the alphabetical arrangement for all small Herbaria. I have for some years adopted it in the Herbarium of the Pharmaceutical Society, in which there are at present about 3000 medicinal plants and about 2000 British plants, and have found it satisfactory in every way: saving time and facilitating reference. Dr. Heckel has adopted the same plan in the Colonial Herbarium at Marseilles. When the collection is a large one, and several rooms and floors are filled with it, it may be conveniently divided primarily into Dicotyledons, Monocotyledons, and Acotyledons, before using the alphabetical arrangement. This arrangement has also the advantage that patriotism does not come into play, as it is not distinctive of any one nation.

I will now direct attention to some facilities that are offered in individual Herbaria for economising time, but which seem to be worthy of general adoption:—

1. *A printed list of the separate collections of plants contained in the Herbarium, besides the general one.*—I have seen lists of this kind prepared for the Hamburg Herbarium by Dr. Voigt, and for that at Oxford by Mr. G. C. Druce; but those of some of the larger Herbaria are certainly not obtainable at present.

2. *A list of all published genera of plants since the year 1895.*—This would be exceedingly useful to every

worker on systematic botany. In the Kew Herbarium a special copy of Bentham and Hooker's *Genera Plantarum* is kept interleaved for the purpose, and a reference is given to the work in which each new genus has been described and its natural order mentioned since the publication of the *Genera Plantarum* (1885). A list of this kind could not be prepared in small Herbaria, but the Government should certainly be at the expense of publishing it either in the *Kew Bulletin*, or as a separate publication, obtainable by working botanists in all our colonies.

3. *A printed list of all the illustrations of plants that have been published since the issue of Pritzel's Icones Plantarum.*—A manuscript list of this kind is kept in two large folio volumes in the Herbarium at Kew, and has been found exceedingly useful, not only for scientific purposes, but also in enabling artists who require drawings for business purposes to refer to them without loss of time; also in cases where no specimen of the plant exists in the Herbarium. Only recently this list was found very useful by the editor and botanical referees of the General Medical Council in the preparation of the new British Pharmacopœia. This list also should be published at Government expense, and no Herbarium should be without it.

4. *A printed list of all the species published since the year 1895, up to which date the Index Kewensis and Durand's Appendix will complete our knowledge.*—It is only in a National or Imperial Herbarium that such a list could be prepared. An additional clerk would be sufficient to keep the list up to date, since the number of new specimens and new names of species does not exceed at present 4000 a year, scattered, however, through an enormous number of publications. But the economy of time that would be effected in all Government Herbaria and Gardens

would be enormous, and the efficiency of the already, as a rule, under-manned staffs of Herbaria would be immensely increased by such a publication, which could be issued annually as a separate part of the *Kew Bulletin*. At present the only means at the disposal of botanists is Just's *Botanischer Jahresbericht*, which is usually two years behind hand, besides being published in German.

5. *The placing at the entrance to each room or floor of an alphabetical list of the 200 or so natural orders, with numbers attached, indicating their position in the rooms of the Herbarium.*—This plan is followed in the botanical department of the Natural History Museum at South Kensington. A list of the natural orders as given in Bentham and Hooker's *Genera Plantarum*, with the numbers corresponding to those given in that work, is given at the end of this paper. But the terminations in the names of the natural orders are so variable in that work that the termination "aceae" is adopted for the natural orders as given in Engler and Prantl's *Natürlichen Pflanzen-Familien*, with the addition of a few other alternative names suggested by Dr. Lindley many years ago, so as to give a uniform termination to indicate natural orders.

6. *The placing of an alphabetical list of the genera, with numbers attached, indicating their sequence, outside the cabinet at the commencement of each natural order.*—This plan also is in use at the Natural History Museum at South Kensington, but the list is placed inside the cabinets.

7. *The placing at the commencement of each genus of an alphabetical list of the species, with the numbers of their sequence attached.*—This might be written either on the millboard used to separate each genus, or, in the case of large genera such as *Piper* and *Croton*, in the form of a manuscript catalogue hung on the inside of the door of the

cabinet. Of course, in a purely alphabetical list of the natural orders, genera, and species, the lists 5, 6, and 7 are unnecessary.

There are also a few other devices, of somewhat less importance, but which seem worthy of more general adoption for facilitating Herbarium work:—

(a) *A reference on the outside of the species-cover to the monograph or Flora that has been followed, and to the page in it on which the species is described.*—This is adopted in the Berlin Museum Herbarium.

(b) *The indication of type specimens by the word "type specimen," and a reference to the work in which it is described.*—When there are a large number of specimens of the same species, such as *Artemisia vulgaris*, it often causes a considerable expenditure of time to find out which specimen best answers to the plant described by the author, if the type specimen, where it exists, is not thus marked.

(c) *The use of a distinctive printed label for all plants quoted in Floras.*—This is also done at Kew. The collector's number is left on the label of the specimen, and the name of the work in which it is quoted is given on a printed label thus: INDEX FLORAE SINENSIS. It is thus possible for any worker in the Herbarium to readily find and examine the very plant the writer has had under examination when the Flora or monograph was written.

(d) *The use of envelopes on each sheet, containing a loose leaf, and flowers and fruit when possible.*—It is often necessary to examine both surfaces of the leaf, and to hold it up to the light to see if there are visible any oil cells, mucilage cells, or resin cavities in the veins, and to examine the structure of the flower or the microscopic structure of the seed. This cannot be done without injury to the specimens when they are, as is usually the case, gummed

on the sheet. These envelopes should be of such a form that they are easily convertible into bags by the use of a wafer or gum on their lower half.

(e) *Cross-references on the genus cover to species separated and placed in other genera* since the publication of the standard work used (e.g., Bentham's *Genera Plantarum*) would be very useful in economising time; and cross-references to the species, the specific names of which have been changed, would be equally useful, especially in such large genera as *Piper*.

(f) *The placing of a card in the Herbarium, or botanical library of the Herbarium, bearing the name of the officer or student who has the covers or book in use for the time being.*—This plan has been adopted in the large botanical library at Kew, and has been found to work most satisfactorily.

These suggestions are not brought forward as the best that could be devised, but as methods that have most of them been tried and appear worthy of more general adoption. Indeed, any plan that will simplify work and economise time, even in Herbaria, seems to me to be worthy of consideration, entirely apart from the person who proposed it, or the country where it is employed.

LIST OF NATURAL ORDERS.

In the following list the termination *aceae* has been employed for nearly all the natural orders, as recommended by Engler and Prantl (*Journ. Bot.*, 1897, p. 305). Where the natural orders given by Bentham and Hooker in the *Genera Plantarum* have been split up by Engler into others, the equivalents are mentioned; and in the few cases in which a different name is given by Engler in a natural order, the name given by the latter is added in parenthesis. The number of the natural orders in the *Genera Plantarum* are given on the left-hand side of the name, and the cross-references to the names used in

Engler and Prantl's *Natürlichen Pflanzen-Familien* are given in italics, and are indented so that, as the arrangement given is an alphabetical one, it will be easy to refer to any natural order, and consequently to its place in the National Herbaria at Kew, or in other museums which follow the same arrangement.

- | | |
|---|--|
| <p>122 Acanthaceae.
 <i>(Aceraceae, sub 51 Sapindaceae)</i>
 <i>(Achariaceae, sub 74 Passifloraceae)</i>
 <i>(Adoxaceae, sub 83 Caprifoliaceae)</i>
 <i>(Aisoaceae=79 Ficoideae)</i></p> <p>194 Alismaceae { Alismaceae.
 Butomaceae.</p> <p>130 Amaranthaceae.</p> <p>174 Amaryllidaceae { Amaryllidaceae.
 Velloziaceae.</p> <p>50 Ampelidaceae (Vitaceae).</p> <p>53 Anacardiaceae { Anacardiaceae.
 Corynocarpaceae.
 <i>(Ancistrocladaceae, sub 29 Dipterocarpaceae)</i></p> <p>5 Anonaceae.
 Apiaceae or Umbelliferae, q.v.</p> <p>106 Apocynaceae.
 <i>(Aponogetonaceae, sub 195 Naiadaceae)</i>
 <i>(Aristolochiaceae=46 Ilicineae)</i></p> <p>191 Araceae.</p> <p>81 Araliaceae.</p> <p>138 Aristolochiaceae.</p> <p>107 Asclepiadaceae.
 Asteraceae or Compositae.</p> <p>150 Balanophoraceae { Balanophoraceae.
 Cynomoriaceae.</p> <p>152 Balanopseae.
 <i>(Basellaceae, sub 131 Chenopodiaceae)</i>
 <i>(Balsaminaceae, sub 38 Geraniaceae)</i></p> <p>133 Batiidaeae.</p> <p>7 Begoniaceae.
 Berberidaceae { Berberidaceae.
 Lardizabalaceae.
 <i>(Betulaceae, sub 159 Cupuliferae)</i></p> <p>120 Bignoniacaeae.</p> <p>17 Bixaceae { Bixaceae.
 Cochlospermaceae.
 Flacourtiaceae.
 <i>(Bombacaceae, sub 31 Malvaceae)</i>
 <i>(Blastiaceae, sub 69 Lythraceae)</i></p> | <p>112 Boraginaceae.
 Brassicaceae or Cruciferae.</p> <p>171 Bromeliaceae.
 <i>(Brunelliaceae, sub 40 Simarubaceae)</i></p> <p>63 Bruniaceae.</p> <p>168 Burmanniaceae.</p> <p>42 Burseraceae.
 <i>(Butomaceae, sub 194 Alismaceae)</i>
 <i>(Buxaceae, sub 151 Euphorbiaceae)</i></p> <p>78 Cactaceae.
 <i>(Callitrichaceae, sub 64 Halorrhagidaceae)</i></p> <p>3 Calycanthaceae.</p> <p>87 Calyceraceae.</p> <p>91 Campanulaceae.
 <i>(Candolleaceae=89 Stylidiaceae)</i>
 <i>(Cannaceae, sub 170 Scitamineae)</i></p> <p>16 Canellaceae (Winteranaceae).</p> <p>12 Capparidaceae { Capparidaceae.
 Tovariaceae.</p> <p>83 Caprifoliaceae { Caprifoliaceae.
 Adoxaceae.
 <i>(Caryocaraceae, sub Ternstroemiaceae)</i>
 <i>(Carcicaceae, sub 74 Passifloraceae)</i></p> <p>22 Caryophyllaceae.</p> <p>158 Casuarinaceae.</p> <p>47 Celastraceae { Celastraceae.
 Hippocrateaceae.</p> <p>197 Centrolepidaceae.
 <i>(Cephalotaceae, sub 59 Saxifragaceae)</i></p> <p>163 Ceratophyllaceae.</p> <p>44 Chailletiaceae (Dichapetalaceae).</p> <p>131 Chenopodiaceae { Chenopodiaceae.
 Basellaceae.</p> <p>30 Chlaenaceae.</p> <p>140 Chloranthaceae.</p> <p>14 Cistaceae.
 <i>(Clethraceae, sub 93 Ericaceae)</i>
 <i>(Cneoraceae, sub 40 Simarubaceae)</i>
 <i>(Cochlospermaceae, sub 17 Bixaceae)</i>
 Clusiaceae or Guttiferae, q.v.</p> <p>118 Columelliaceae.</p> <p>66 Combretaceae.</p> |
|---|--|

- 183 Commelinaceae.
 88 Compositae or Asteraceae.
 165 Coniferae or Pinaceae.
 56 Connaraceae.
 113 Convolvulaceae.
 54 Coriariaceae.
 82 Cornaceae.
 (Corylaceae, sub Cupuliferae 159)
 (Corynocarpaceae, sub 53 Anacardiaceae)
 60 Crassulaceae.
 (Crossosomataceae, sub Dilleniaceae)
 11 Cruciferae or Brassicaceae.
 75 Cucurbitaceae.
 (Cunoniaceae, sub 59 Saxifragaceae)
 159 Cupuliferae { Betulaceae.
 Fagaceae.
 166 Cycadaceae.
 189 Cyclanthaceae.
 (Cynocrambaceae, sub 153 Urticaceae)
 (Cynomoriaceae, sub 150 Balanophoraceae)
 199 Cyperaceae.
 46a Cyrillaceae (*Gen. Plant.*, vol. ii., p. 1225).
 137 Cytinaceae { Rafflesiaceae.
 Hydnoraceae.
 77 Daticaceae.
 96 Diapensiaceae.
 (Dichapetalaceae = 44 Chailletiaceae)
 2 Dilleniaceae { Dilleniaceae.
 Crossosomataceae.
 176 Dioscoreaceae.
 86 Dipsacaceae.
 29 Dipterocarp- { Dipterocarpaceae.
 aceae { Ancistrocladaceae.
 61 Droseraceae.
 102 Ebenaceae.
 25 Elatinaceae.
 147 Elaeagnaceae.
 (Elaeocarpaceae, sub 33 Tiliaceae)
 162 Empetraceae.
 95 Epacridaceae.
 Ericaceae.
 93 Ericaceae { Clethraceae.
 Pirolaceae.
- 196 Eriocaulonaceae.
 (Erythroxylaceae, sub 34 Linaceae)
 (Eucryphiaceae, sub 58 Rosaceae)
 151 Euphorbiaceae { Euphorbiaceae.
 Buxaceae.
 Fabaceae or Leguminosae.
 (Pagaceae, sub Cupuliferae)
 79 Ficoideae (Aizoaceae).
 (Flacourtiaceae, sub 17 Bixaceae)
 85 Flagellariaceae.
 (Fouquieriaceae, sub 24 Tamaricaceae)
 21 Frankeniaceae.
 (Geissolomaceae, sub 146 Peneaceae)
 109 Gentianaceae.
 38 Geraniaceae { Geraniaceae.
 Oxalidaceae.
 Tropaeolaceae.
 Limnanthaceae.
 119 Gesneraceae.
 (Globulariaceae, sub 124 Selaginaceae)
 164 Gnetaceae.
 (Gomortegaceae, sub 143 Lauraceae)
 (Gonystylaceae, sub 145 Thymelaeaceae)
 90 Goodenoviaceae.
 200 Graminaceae.
 (Grubbiaceae, sub 149 Santalaceae)
 27 Guttiferae or { Guttiferae.
 Clusiaceae { Quiinaceae.
 172 Haemodoraceae.
 64 Halorrhagid- { Halorrhagidaceae.
 aceae { Callitrichaceae.
 62 Hamamelid- { Hamamelidaceae.
 aceae { Myrothamnaceae.
 (Hermandiaceae, sub 143 Lauraceae)
 (Hippocrastanaceae, sub 51 Sapindaceae)
 (Hippocrateaceae, sub 47 Celastraceae)
 35 Humiriaceae.
 (Hydnoraceae, sub 137 Cytinaceae)
 167 Hydrocharitaceae.
 111 Hydrophyllaceae.
 (Hydrostachyaceae, sub 135 Podostemaceae)
 26 Hypericaceae, sub Guttiferae.
 (Icacinaceae, sub 45 Olacaceae)
 46 Ilicaceae or Aquifoliaceae.
 129 Illecebraceae, sub Caryophyllaceae
 173 Iridaceae.

- 156 Juglandaceae.
 186 Juncaceae.
*(Uncaginaceae, sub 195 Naiadaceae)
 (Kaeberliniaceae, sub 40 Simarubaceae)*
 126 Labiate or Lamiaceae.
*(Lactoridaceae, sub 139 Piperaceae)
 (Lardizabalaceae, sub 7 Berberidaceae)*
 161 Lacistemaee.
 Lamiaceae or Labiate.
 Lauraceae.
 143 Lauraceae { Gomortegaceae.
 Hernandiaceae.
 57 Leguminosae or Fabaceae.
 155 Leitneriaceae.
 192 Lemnaceae.
 97 Lennoaceae.
 117 Lentibulariaceae.
 178 Liliaceae.
(Limnanthaceae, sub 38 Geraniaceae)
 34 Linaceae { Linaceae.
 Erythroxylaceae.
 72 Loasaceae.
 108 Loganiaceae.
 148 Loranthaceae.
 Lythraceae.
 69 Lythraceae { Punicaceae.
 Blastiaceae.
 Oliniaceae.
 4 Magnoliaceae { Magnoliaceae.
 Trochodendraceae
(Malesherbiaceae, sub 74 Passifloraceae)
 36 Malpighiaceae.
 31 Malvaceae { Malvaceae.
 Bombaceae.
*(Marantaceae, sub 170 Scitaminaceae)
 (Marcgraviaceae, sub 28 Ternstroemiaceae)
 (Martyniaceae, sub 121 Pedaliaceae)*
 182 Mayacaceae.
 68 Melastomataceae.
 43 Meliaceae.
(Melianthaceae, sub 51 Sapindaceae)
 6 Menispermaceae.
 142 Monimiaceae.
 94 Monotropaceae, sub Pirolaceae.
(Moraceae, sub 153 Urticaceae)
- 55 Moringaceae.
(Musaceae, sub 190 Scitaminaceae)
 123 Myoporaceae.
 157 Myricaceae.
 141 Myristicaceae.
(Myrothamnaceae, sub 62 Hamamelidaceae)
 100 Myrsinaceae.
 67 Myrtaceae { Myrtaceae.
 Lecythidaceae.
(Myzodendraceae, sub 149 Santalaceae)
 Naiadaceae.
 195 Naiadaceae { Potamogetonaceae.
 Aponogetonaceae.
 Juncaginaceae.
 136 Nepenthaceae.
 128 Nyctaginaceae.
 8 Nymphaeaceae.
 41 Ochnaceae.
 45 Olacaceae { Olacaceae.
 Opiliaceae.
 Iacacinaceae.
 104 Oleaceae.
(Oliniaceae, sub 69 Lythraceae)
 70 Onagraceae.
(Opiliaceae, sub 45 Olacaceae)
 169 Orchidaceae.
 118 Orobanchaceae.
(Oxalidaceae, sub 38 Geraniaceae)
 187 Palmaceae.
 188 Pandanaceae.
 10 Papaveraceae.
 74 Passifloraceae { Passifloraceae.
 Malesherbiaceae.
 Achariaceae.
 121 Pedaliaceae { Pedaliaceae.
 Martyniaceae.
 146 Penaeaceae { Penaeaceae.
 Geissolomaceae.
(Pentaphalaceae, sub 28 Ternstroemiaceae)
 180 Philydraceae.
(Phrymaceae, sub 125 Verbenaceae)
 132 Phytolaccaceae.
 Pinaceae or 65 Coniferae.

139 Piperaceae	Piperaceae. Saururaceae. Lactoridaceae. (<i>Nolanaceae</i> , sub 113 <i>Convolvulaceae</i>) (<i>Oxalidaceae</i> , sub 38 <i>Geraniaceae</i>) (<i>Pentaphalaceae</i> , sub 28 <i>Ternstroemiaceae</i>) (<i>Pirolaceae</i> , sub 93 <i>Ericaceae</i>)	Sapindaceae. Aceraceae. Hippocastanaceae. Staphyleaceae. Melianthaceae.
18 Pittosporaceae.		
127 Plantaginaceae.		
154 Platanaceae.		
98 Plumbaginaceae.		
135 Podostemon-	Podostemonaceae. aceae Hydrostachyaceae.	
110 Polemoniaceae.		
20 Polygalaceae.		
134 Polygonaceae.		
179 Pontederiaceae.		
23 Portulacaceae.	(<i>Potamogetonaceae</i> , sub 195 <i>Naiadaceae</i>)	
99 Primulaceae.		
144 Proteaceae.	(<i>Punicaceae</i> , sub 19 <i>Lythraceae</i>) (<i>Rafflesiaceae</i> , sub 137 <i>Cytinaceae</i>) (<i>Pyrolaceae</i> = <i>Pirolaceae</i>) (<i>Quinaceae</i> , sub 27 <i>Guttiferae</i>)	
1 Ranunculaceae.		
184 Rapateaceae.		
13 Resedaceae.		
198 Restionaceae.		
49 Rhamnaceae.		
65 Rhizophoraceae.		
58 Rosaceae	Rosaceae. Eucryphiaceae.	Styraceae. Symplocaceae.
177 Roxburghiaceae = Stemonaceae.		
84 Rubiaceae.		
39 Rutaceae.		
52 Sabiaceae.		
160 Salicaceae.		
105 Salvadoraceae.		
71 Samydaceae, sub Flacourtiaceae.		
149 Santalaceae	Santalaceae. Myzodendraceae. Grubbiaceae.	Tamaricaceae. Fouquieriaceae. Theaceae. Caryocaraceae. Marcgraviaceae. Pentaphalaceae. Stachyuraceae.
		Thymelaeaceae. Gonystylaceae. (<i>Tovariaceae</i> , sub 12 <i>Capparidaceae</i>) (<i>Trigoniaceae</i> , sub 20a <i>Vochysiaceae</i>)

33 Tiliaceae	Tiliaceae. Elaeocarpaceae.	92 Vacciniaceae, <i>sub</i> Ericaceae.
19 Tremandraceae.		85 Valerianaceae. <i>(Velloziaceae, sub 174 Amaryllidaceac.)</i>
193 Triuridaceae.	<i>(Trochodendraceae, sub 4 Magnoliaceae)</i> <i>(Tropaeolaceae, sub 38 Geraniaceae)</i>	125 Verbenaceae { Verbenaceae. Phrymaceae.
73 Turneraceae.		15 Violaceae. <i>(Vitaceae=50 Ampelidaceae)</i>
190 Typhaceae	Typhaceae. Sparganiaceae. <i>(Ulmaceae, sub 153 Urticaceae)</i>	202 Vochysiaceae { Vochysiaceae <i>(Gen. Plant., i., p. 975.)</i> Trigoniaceae <i>(Winteraceae=16 Canellaceae)</i>
80 Umbelliferae or Apiaceae.		181 Xyridaceae. <i>(Zingiberaceae, sub 170 Scitaminaceae)</i>
153 Urticaceae	Urticaceae. Ulmaceae. Moraceae. Cynocrambeaceae.	37 Zygophyllaceae.

SCULPTURE IN ART MUSEUMS.

By JOHN MACLAUCHLAN, The Albert Institute Museum, Dundee.

THE word "advantages" which originally appeared in the programme title of this paper was, I felt, a rather infelicitous one to use, because it would be absurd for me to begin to talk about the "advantages" of a sculpture collection to gentlemen all more or less engaged in the management of museums, and it would be still more foolish to attempt anything like a disquisition on the sublime art of sculpture. The magnificence of the art, and the advantage of possessing as much of it as possible, are admitted by all, although considerations of finance or of space may prevent the realisation of this wish.

I may, however, render some little practical service if I tell how the small and not too well endowed museum with which I am connected acquired at comparatively little cost a fairly large collection, which, if not gigantic in size, includes the best procurable casts of the more famous Greek and Roman examples, a considerable representation of the best work of the Italian Renaissance, and of architectural detail from Germany, France, and our own country. We did not forget the earliest development of true sculpture—as distinguished from the efforts of savage races—and purchased a number of good examples of Egyptian and Assyrian sculpture. Competent authorities assure us that, as a *systematic* collection, ours is practically the largest and most useful in Scotland—we do not desire to compare it

with the unique collection of *statues* in the Antique Gallery of the Royal Institution, Edinburgh—and that, from the *systematic* point of view, is not excelled in many places out of London. So far as Scotland is concerned, it will not remain so very long, for when our friend Mr. Paton of Glasgow gets his magnificent new Museum and Galleries completed, he will soon be ahead of every place except South Kensington, and the British Museum. But the special merit of our collection is not its size, which after all is not very great, but the fact that it was specially organised to be a systematic historic representation of all the schools, including in due proportion purely architectural sculpture, as well as that which is detached ideal work or portraiture, in the rather wide sense in which the frieze of the Parthenon, or a Bavarian mantelpiece is architectural, and the Venus de Medici, or the Germanicus is ideal or portraiture. Many large and fine collections exist which have not this character, which include casts of most of the great statues, busts, and reliefs, but from which purely architectural sculpture is nearly or entirely absent, and in which many schools, most important in the development of the art, are unrepresented. However small in size, a museum collection of sculpture ought to be systematically inclusive of all the periods and schools, so that it may be, even in miniature, a history of the art. This is, no doubt, but a truism, and is applicable not only to all departments of art, but to all museum objects whatever, but it is especially true of sculpture, the history of which, from the carved bone of the cave dweller to the Hermes and the Venus of Melos, on to the work of Donatello and Canova, forms a strictly consecutive whole, without the gaps which exist in most histories of objects or countries—doubtless owing to the enduring material in which sculpture is executed. The extreme desirability of forming such a collection had for years been

pressed upon the attention of our committee by its present convener, Mr. John Kennedy, who has been a member since its establishment thirty years ago, and is well known as the real inventor of the indicator now largely used in public libraries—an invention which he unselfishly refused to patent, allowing others to get the profit, and also the credit, if they choose to claim it. Mr. Kennedy's efforts were finally successful, mainly owing to the support given by Dr. Petersen, then principal of our University College, now principal of M'Gill University, Montreal. Whilst in Dundee, Principal Petersen also occupied the Chair of Classics, for the proper teaching of which he held a collection of casts of classic sculpture to be quite indispensable. Dr. Petersen did not confine his assistance to theoretical advice, but gave genuine practical assistance by raising among his friends the sum of about £100 to begin the fund. As it had been ascertained that the amount necessary was not really very large, the committee resolved to face the necessary expenditure, with the help to be obtained from the Science and Art Department, and, desiring to make the most representative collection possible on so small a scale, asked the advice of Prof. Baldwin Brown, Professor of Fine Art in the University of Edinburgh. Prof. Brown, who has for years made a special study of the subject, is a recognised authority in sculpture, and this wide knowledge and experience he frankly placed at our service. We also received most valuable help from the Science and Art officials of the South Kensington Museum, especially from Mr. H. M. Cundall, then head of the circulation and "grant-in-aid" branch of that institution, from Mr. W. W. Watts, his successor in that office, and from Mr. R. F. Martin, also of that special department. Mr. Cundall visited Dundee to see that the gallery was suitable, and, when there, gave the committee most valuable advice,

and rendered me much personal assistance entirely outside his official duty when I visited London in connection with the selection of examples. From Mr. Watts, who also visited Dundee later on, and from Mr. Martin, who has frequently done so, we received like assistance and many valuable suggestions, and, in view of what has recently taken place, it gives me great pleasure to state that, during a connection dating from 1873 with the South Kensington Museum, we have uniformly received very valuable aid, always given with the most perfect courtesy. The Science and Art Department, having approved of our proposal, promised us the largest possible rate of a grant-in-aid—50 per cent.; and we also had the skilled technical knowledge of these experienced officials to supplement that of Prof. Baldwin Brown in making a selection, and in the almost more difficult task of finding out where, all over Europe, the best possible casts could be purchased. This knowledge is almost unattainable by those who only know sculpture, however deeply, from books. Our most recent acquisitions were superb copies of the finest works by the masters of the Italian Renaissance, taken from special moulds made under the supervision of the officers of the department, and destroyed after our casts had been taken. The first year the grant-in-aid amounted to £153—perhaps not a large sum in itself, but large indeed in relation to the small amount (£500) granted by Parliament for this purpose, with the whole of Britain to spread it over. Subsequent grants-in-aid raised the amount to £250, and the total cost of the collection, including the providing of pedestals and all other outlays, has been £610. It will be noticed that the grant-in-aid falls short by £60 of the 50 per cent. referred to—the explanation being that the department does not pay any share of packing and carriage, or of pedestals. The two former items become important in the case of

statues bought, say, in Rome, sculpture being the most expensive of all museum objects to pack and convey.

We have not added many examples recently, not because there were no statues to acquire, but because space was exhausted. For this, as well as for artistic reasons, we have recently been purchasing reproductions in bronze—which, with the assistance of the department, can be done at surprisingly low prices. The collection, deducting the grant-in-aid of £210, and the money raised outside in subscriptions, has only cost the committee £200. It would have cost considerably more had not the Dundee and London Shipping Company, with great public spirit, conveyed all the works from London free. I hope other cities will find equally generous friends. It consists of nearly 300 casts, great and small, and also of a considerable number of large photographs of remarkable sculptures. The average cost per cast is under £2, explained by the fact that although some of the statues and bronzes cost £20 each, many of the architectural subjects may be obtained for a few shillings.

The gallery in which we placed the collection, although fairly suitable, is by no means an ideal one—we have such ideal galleries, but we have to keep them for paintings, which, even more than sculpture, demand a top light. But still the gallery is splendidly lit by a number of large windows looking south, and we have a brilliant installation of the electric light in the evening. The gallery is 80 feet long, 32 feet wide, and 18 feet high, and in it the casts are grouped as artistically as we could conveniently place them. The Elgin Marbles form the frieze as they did of their old home the Parthenon, the busts are placed on brackets on the wall, and the statues arranged on pedestals on the floor. The architectural sculptures are mostly placed on the south wall, but so hung that they can

be easily taken down and placed on easels for students. There are sloped glass cases on the wide window sills, for small objects like the Tanagra terra cottas. All the casts are very well seen, and there is considerable floor space left for visitors. Visitors, almost to our surprise, we have by the hundred thousand—visitors mainly composed of classes who do not affect to know much about ancient sculpture. We have closely watched the attitude of these, and, instead of the bored stare, the yawn, and the quick passing on to metal more attractive, which some prophesied, have seen from the outset unmistakable signs of interest and admiration, leading up in many cases to the study of the subject and the acquisition of knowledge.

In this, as in many cases, genius—here the very highest genius—asserted itself, and won the homage and admiration which are its due. Doubtless there were exceptions not always confined to the popular visitors. A gentleman, highly cultured in most directions, but very specially interested in another class of museum work, suggested that we should make more room for his favourite specimens by, as he put it, “sticking these stucco figures up into some garret.” Shades of Pheidias and Praxiteles, of Donatello and Michael Angelo, forgive him such Philistine blasphemy! I have made efforts to foster popular appreciation by occasionally giving short lectures, and by the publication of a brief guide, sold at the modest charge of one halfpenny. Besides these crowds of popular visitors, we have large numbers of students, for although we have no connection with any school of art, our governing body being the Free Library Committee, we have many students from the art and technical schools, and pupil teachers and junior masters from the Board schools. Also, quite a number of young men engaged in business, such as the assistants of architects, decorators, &c., who come to study, some of

them as early as six in the morning, and these and all other students we gladly welcome and assist in every possible manner. Then we have students of a higher class, Professor Baldwin Brown, who assisted us in the formation of the collection, sometimes bringing all the students of his class (Fine Art) from Edinburgh to spend a day among the casts, and but the other day the professor of architecture in the Anderson College, Glasgow, brought over forty students. I should like to mention here that when we acquired the casts, we were strongly advised by Professor Baldwin Brown not to paint them as is usually done, a process which, two or three times repeated, soon fills up the more delicate modelling and robs the sculpture of its clearness of outline. We treated the surface with a wash of his discovery, the thinnest varnish known, made up of one part of ordinary spirit varnish to two parts of methylated spirits, and at first this is certainly very much better than paint, for it is so thin that whilst it takes away that disagreeable snowy whiteness which proclaims their stucco origin, it makes no perceptible difference on their sharpness of outline. But it has one drawback, for when, after a time, the casts get dirty this varnish can hardly be washed. The weakest soap and water is apt to take it off the exposed parts, and in doing so you may rub and injure the surface. It cannot be re-varnished ; if this was done it would shine like a mirror. The authorities at South Kensington have been making experiments, and they think that they have discovered a process of treating the surface with a very thin specially prepared paint, applied in a peculiar manner, which will not fill up the delicate modelling, and will easily wash for many years. We have some examples done in this new manner, and I hope that it will prove a success, for the matter is an important one, as casts were usually either frightfully dirty, or had gained cleanliness at the

expense of all sculptural character and grace. It is also important, because although highly-cultured experts, regarding only the severely technical and historical qualities, may be indifferent to tint even if the casts are oiled or varnished brown, the popular visitors, which it is the duty of museums to refine and to educate, will be much more easily attracted if your sculpture is beautiful in colour as well as in form. It is imperative for their preservation that casts must be coated with some substance, and in doing so, it is surely not necessary to make them hideous in appearance.

I hope that what I have said will not lead any one to suppose that I regard our collection as an unduly important one, because it is really not large, and our success in the far north has not arisen from our merits so much as from the lack of better collections ; and this, as I have said, will be soon altered in Glasgow, to which city the pilgrims of sculpture will direct their willing feet, rather than to Dundee. In provincial England, you have already the fine collection in Preston, so artistically and effectively grouped, and the large ones in Liverpool and other places. The merit we can claim is, that our collection has a representative character as a systematic object-lesson and history of this great and most ancient of arts. Doubtless some may think that the rather matter-of-fact, possibly trivial, details which I have been giving do not justify so long a story, as all museum authorities may be aware of them ; but I do not think that it is generally known that so much can be done, and that so representative a collection can be acquired for so small a sum as £600—in our case, with the assistance of South Kensington and friends, for £250—at least, if this is known, it is not taken advantage of. I thought that an explanation of the steps which we took to acquire this collection might be of service to some museum

authorities, and perhaps lead to the formation of such educational collections of this great art in towns even smaller than Dundee. We frequently see fine statue casts in entrance halls, and dotted here and there about galleries, but however decorative this may be, these works can never form a systematic collection fitted to display the history of sculpture.

It is difficult indeed to accurately estimate the good effect which art collections produce on the minds and the tastes of the communities among which they are placed. Fortunately, rather than unfortunately, it is one of the things which cannot be weighed or measured or tabulated. But the good effect can easily be distinguished for all that ; and close special observation justify us in declaring that this most desirable effect has been undoubtedly produced during the ten years we have had this collection. We have been favoured with unmistakable proofs of it in the other branches of our art work—in our permanent collection of paintings, and in a peculiar, but very clear way, in connection with our annual Artists' Exhibitions. These, somehow, have been unusually successful in Dundee. One year, our sales amounted to nearly £9,000 ; and our annual average for a quarter of a century is over £5,000, which places us relatively, almost indeed absolutely, second in this respect amongst British exhibitions out of London. After a time an extraordinary and most gratifying change came over the character of the pictures sold. From our first exhibition, a clever artist, whose facile brush produced pretty but feeble pictures, sold six works. Next year he sold five, another year two, then one, latterly none, and then he ceased to send. There were many other cases similar, if not so striking, and, generally speaking, it is quite impossible now to sell the class of works which were in demand twenty years ago. Is not this

a genuine triumph of high, serious art, that it should, unperceived by the visitor, train his mind and elevate his taste ; and am I not warranted in thinking that the frequent contemplation of the severe, pure beauty of these classic sculptures may have greatly assisted this good work ?

In sculpture we are indeed the “heirs of all the ages,” and it is humiliating to confess that, try as earnestly as our fathers could, and we can, we have not been able to add to this portion of the priceless fortune bequeathed us. There is one feature of sculpture which ought to be interesting to museum authorities ; it is really the connecting link between the art and the natural science departments of a museum, and it might serve to teach anatomy as well as art, for the old Attic sculptors put the very best taxidermists to shame.

At the outset, I said that it would be absurd, if not impertinent for me to lecture on sculpture as an art, and I hope I am not breaking my promise. But all stories should conclude with a moral, and the moral which the daily contemplation of the best works of the purest of arts has taught me is that of which I have just spoken—the great Christian virtue of humility. In this, our own marvellous era, which has so out-distanced the past in most things, which is so proud of having done so, and so ready to proclaim it, is it not a profitable lesson to learn that there is at least one notable exception to our superiority ? Surely it is good for us to know that, amidst all our scientific and mechanical triumphs, there are works in literature and art produced two thousand years ago which have defied, and still defy, the competition of the ages. Even in this great city of Sheffield, in the very vanguard of modern practical genius, it may not be unprofitable to recollect that great as are art and literature, mechanics and science, humility is greater still.

PROVINCIAL MUSEUMS AND THE MUSEUMS ASSOCIATION.

By H. BOLTON, F.R.S.E., Curator of the Bristol Museum.

MUSEUM development in the near future has become so serious a question, that no apology is, I think, needed, in bringing it again before the Association. All discussions, and all suggestions advanced have made plain one very significant fact, namely—that no precise details of museums or their maintenance, scope, and staff, are available.

The magnitude of the question is, therefore, not easily determinable, if at all, and no successful scheme of development, or of correlation and coherence can be evolved, until we have full details published of what provincial museums exist, what they are, and what they do.

The want of this knowledge was felt in the past, and three different bodies attempted to supply it. In 1894, the Science and Art Department issued a list of museums in the United Kingdom. It contained the names of 158 museums, and was acknowledged to be incomplete. In 1884, a return to an Order of the House of Commons gave a list of 41 museums established under the Public Libraries Act.

The last, and by far the most complete list, was that submitted in 1887 to the British Association at the Manchester Meeting, by a committee appointed to prepare a report upon the provincial museums of the United

Kingdom. From that date down to the present, nothing in the nature of a complete report or directory of museums has been compiled.

It is therefore not to be wondered at, that suggestions and schemes for united work and help do not awaken enthusiasm. They are so many shots in the dark ; and, however good in themselves, fail to succeed, because they are not drawn up with a complete knowledge of the facts.

What, then, is the state of things to-day ?

It is, we take it, this :—Either revolutionary, or other schemes are not needed, and museums are best left as they are ; or else, any scheme put forward is liable to be faulty, in that the author of such a scheme does not fully know the conditions he desires to satisfy.

We all admit, I think, that museums are not best left as they are ; there is an unanimous call for more funds, for enlightened administration by museum committees, for increased staffs, and last and most important of all, for a full recognition of the great power and utility of museums as an arm of education, of culture, and of public benefit.

If the present conditions are unsatisfactory, and I take it they are, what is the remedy ? Can each museum work out its own salvation ? We fear not ; too often it is one man—the curator—against many, and if there be no active opposition, there is that which is much worse—absolute indifference.

Can museums unitedly work for a common good and a full and frank recognition of their usefulness ? Certainly they can. But they can only claim a hearing, and thus set out on the way to success, by first demonstrating their scientific, educational, and public importance.

It is said that the best way to make John Bull consider a matter is by showing him how much he has to pay for it. If the way to an Englishman's heart lies through

his stomach, the way to his brain lies through his pocket.

Suppose we consider the monetary side of the question first ; it is sordid, I grant, and I would rather not use it, were other means more readily available.

An estimate of the annual cost of provincial museums must, in the present state of our knowledge, be based more or less upon the British Association Report of 1887. This report gives us 56 museums of the first class, the maintenance of each of which is estimated to cost £800 per annum on an average. It also gives 55 museums of a second-class character, whose maintenance may cost anything from £100 to £500 per annum. Suppose we take the annual cost of second-class museums as averaging £300 each.

What was the total cost for 1887 for the maintenance of these museums ? It means that from various sources, the British Isles were in 1887 raising and spending in one year a sum of not less than £60,000 for museums of supposed first, and second-class character.

The British Association Report added two additional classes of museums, which would, we think, make the gross total of museum expenditure in 1887, for all classes, not far short of £100,000.

But that was in 1887.

To-day we can, I feel sure, safely say that museum interest has trebled and quadrupled in the past decade, and museum expansion has been considerable. What it has been, we do not know, but we ought to know ; and I would hazard the statement that if accurate returns could be made of the expenditure of all provincial museums for 1898, it would be found to fall little short of a quarter of a million of money—£250,000.

If it were possible to disclose also the value of the

collections which cost so much to maintain, and also of the buildings in which they are exhibited, I think even the most seasoned curator would be staggered at the total. But statistics and annual returns of museums are not available, and in our endeavour to help ourselves and one another, we grope in the dark.

We must have this information of what museums exist, where they are, what they are, how they are staffed, how maintained, and how they supply the needs of the community in which they are placed. In short, it is a pressing necessity that a very full and complete return be made of all provincial museums, and that such a return, once made, should be kept in order by annual revision.

Not only is this needed in a common interest, and for a fuller knowledge of the gravity of the museum question, but it is needed individually. For instance, with such a report in his hands, a curator could easily arrest the attention of his committee when the museum falls below the common standard of equipment and maintenance.

The publication of such a report, and its annual revision, would tend to bring museums into close union and to a common knowledge of each other, and would help largely to prevent abuse on the part of committees and honorary curators, or a slackening in the work of the curator himself.

Suppose it should be conceded by this assembly that a return of museums is needed. How has it to be obtained? We would urge through the agency of this Association.

This is the Museums Association, and in the introductory note of its last Annual Report it modestly extended its scope of work and interest to the ends of the earth. Let it know the members of its own house, and thus show its *bona fide*.

Jesting apart, in the interest of our weaker brethren, in our mutual interest, in order that we may rightly

appreciate the responsibility of our work, and before we can claim to be heard, or hope to make our influence felt in high quarters, the facts of museum development, administration, and utility, must be demonstrated.

We must now consider how such a return or report can be obtained. Obviously it will be costly, and take time. Funds will also be needed to meet the cost; and either a small committee charged with the task, as in the case of the British Association, or several sectional committees formed to divide the work between them, and obtain the details of their own section of the country.

The matter of funds we think could be met in one of two ways. (1) Either by approaching the British Association, at its next annual meeting at Bristol, for a grant sufficient for the purpose; or (2) by an application to the Royal Society for a moiety of the Government Grant of £4000, which it distributes annually. Upon each there is a good claim; upon the first inasmuch as the British Association already acknowledges the importance of such a report and its own interest in the matter; upon the latter because the publication of such a report is of national and scientific benefit and importance.

This is the view we take of the provincial museum question as it now stands, and we are convinced that the issue of such a report will be stimulating in the highest degree to the well-being and success of this Association, whilst it will also lay the foundation for a correlation and co-ordination of museums as a whole.

THE ELECTRIC LIGHT INSTALLATION IN THE MANCHESTER MUSEUM.

By W. E. HOYLE, M.A., F.R.S.E., Keeper of the Museum.

THE object of the present communication is to give as briefly as possible a sketch of the procedure adopted in installing the light in the Manchester Museum, in the hope that our experience may be useful to kindred institutions.

In the first place we may consider for a moment the objects to be attained by a perfect system of lighting, for it is well to have an ideal, even though our performance may, nay, indeed must, in some particulars, fall short of it.

The most important points to aim at seem to be as follows:—

1. The objects to be illuminated are the contents of the cases and not the rooms of the museum, hence the first care and attention of the designer must be concentrated on the former, and the latter left for secondary consideration.
2. Every specimen must be fully and evenly illuminated, so that even minute sculpture on its surface can be seen, and the labels read with ease.
3. There must be no strong shadows, and special precautions should be taken to prevent the shadow of the visitor from falling upon the object he is studying.
4. There must be no intense lights to attract the eye and then leave it temporarily blinded.

5. The light must be so arranged that there are no strong reflections from the glass fronts of the cases.

In short, the artificial light must be as much like daylight as possible.

I believe there are no practical rules of universal application for the attainment of these objects, except perhaps the negative one that unshielded arc lamps are to be avoided. Every building must therefore be considered on its own merits, and my first advice would be : "Do not put yourself in the hands of any electrical engineer, however eminent, until you have made some preliminary experiments of your own."

These experiments need not be very costly. Museums are generally situated in large towns, and nowadays there is usually some source of electricity near at hand which can be temporarily utilised for the purpose. In our own case it was rendered particularly easy by the fact that the physical laboratory of the Owens College possesses a dynamo sufficiently powerful to furnish a current for one or two lamps.

The first experiments were made with incandescent lamps of 16 candle power, and the method adopted was to place these inside the cases. The advantages, which it was hoped would be secured by this means, were the total absence of unpleasant reflections and diminished risk of breakage. There was also the possibility of entirely concealing the actual incandescent filament from the spectator and concentrating all its light on the specimens. Our first essay was made with one of the upright cases in the geological department, where there are sloping shelves 18 inches to 2 feet apart. Under these the lamps were concealed so that their light shone down upon the shelf below, upon which it was further reflected by the white surface just above it. The effect was very satisfactory,

except that the illumination was, of course, stronger immediately under the lamp than a little to the side. With the upright cases in which mounted animals and birds were exhibited, where the shelves were horizontal and the objects of all shapes and sizes, this method was absolutely impracticable. Furthermore, it soon appeared that if the specimens were at all near the front of the case, the light fell so obliquely as to be comparatively ineffective ; there was, if I may use the expression, no room for the light to get at the specimens, and in regard to table cases the method was, of course, quite inapplicable.

Matters had reached this point when I became acquainted with the inverted arc. From the description it did not seem likely to be perfectly efficient, but one was borrowed and tried. Perhaps it may be here explained that an inverted arc is one in which the thick (+) carbon is placed below the thin (−) one, so that the bulk of the light is projected upwards. The direct light is further prevented from reaching the eyes of visitors by a conical reflector placed below it. The lamp is suspended two or more feet below a white ceiling, from which the light diffuses through the apartment.

The effect is most striking, and I at once saw that for our museum this was *par excellence* the system to adopt wherever practicable. The light was soft and diffused evenly almost like daylight—in fact, much better than many of the samples of daylight supplied in Manchester—and every corner of the cases seemed to be equally illuminated. There were no shadows even when the observer stood with his back to the light examining specimens just in front of his body. Fig. 4 (page 103) shows the appearance of one of these lamps in position.

Unfortunately the third floor of our Museum is only about eight feet high, and it was therefore impossible to

adopt this method owing to the lack of head room. Here it was only possible to use incandescent lights, and to strive to arrange them experimentally to the best advantage. They are suspended from the beams of the roof over the desk cases, and on the table cases, which have an upright centre and sloping sides, they are carried on curved brackets so as to direct the light obliquely on both the vertical and sloping surfaces (*see* Fig. 6, page 104).

We were now in a position to calculate the number of lamps that would be required, and to form some idea of the probable cost of the installation, after which the next thing was to find the money. I mentioned the matter to a generously-minded citizen, and after some little time I learned that my words had fallen on good ground, and that £500 would be at the disposal of the treasurer for this purpose.

The next point was the specification, and here let me venture another word of warning. If you desire an installation, and invite half a dozen electricians to tender for it, you will receive half a dozen specifications so different that you cannot possibly compare them.

We therefore decided to draw up our own specification, and for this purpose I enlisted the services of a friend who was an expert in the matter. The document which we prepared was submitted to a well-known electrical engineer, who is a member of the governing body of the College, and declared by him to be satisfactory. It was then sent out to electrical firms, who were invited to tender on it, and to mention any respects in which they thought the system proposed could be improved.

Eventually the work was entrusted to Messrs. G. A. Steinthal, and I am indebted to them for the description of the installation which follows :—

MANCHESTER MUSEUM ELECTRIC LIGHTING.

The lighting is carried out by means of—

44 Arc lamps.

162 Incandescent lamps.

11 Sockets for movable lamps.

The current is obtained from the supply mains of the Manchester Corporation. Five mains are brought into the building with a pressure of 100 volts between each main.

It was decided, in order to save copper in the incandescent circuits, to arrange the wiring for 200 volt lamps. It was

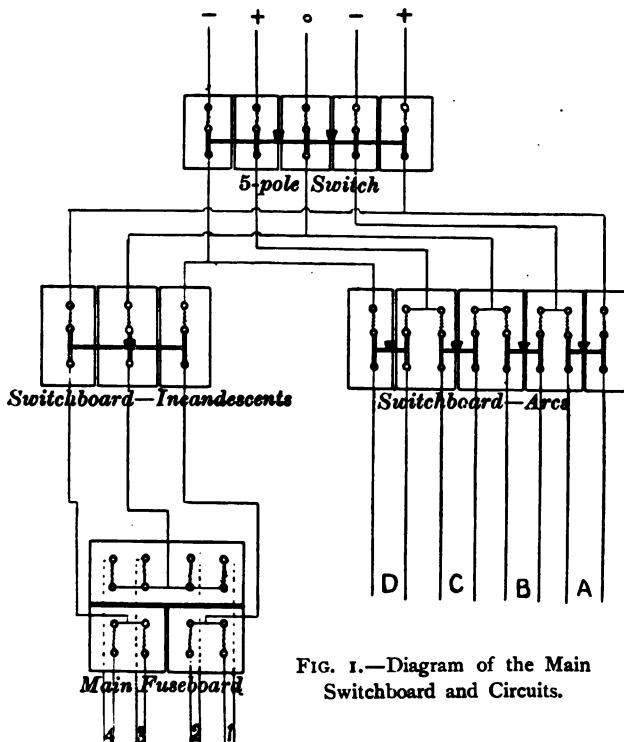


FIG. I.—Diagram of the Main Switchboard and Circuits.

therefore necessary to keep the arc and incandescent systems entirely separate, and this object has been attained in the following manner (see Fig. 1):—

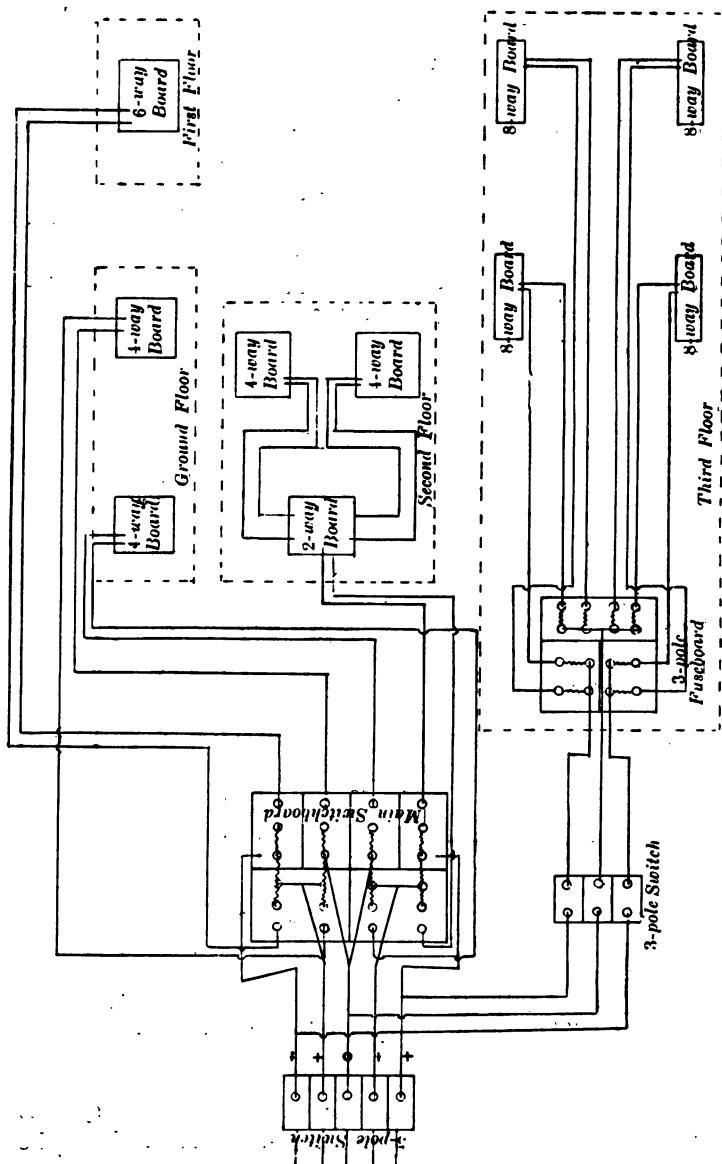


FIG. 2.—Diagram showing the arrangement of Switchboards on the different floors of the Museum.

The five mains above mentioned are connected to a 5-pole main switch, and from this switch 5 mains are carried to a main switchboard fixed in the porter's lodge. This switchboard is designed to connect the 5 wires to 4 arc lamp circuits, and to a 3-wire circuit for the incandescent system. The latter system is connected to the switchboard through a 3-pole switch, the



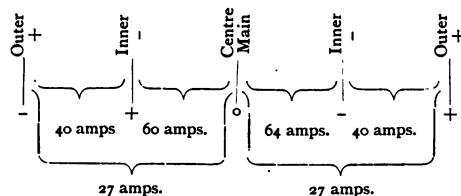
FIG. 3.—Part of the ground floor of the Museum when lighted up.

centre pole being connected to the centre panel of the main switchboard, and the two outers to the two outer panels of the main switch. We have therefore 5 controlling switches in the porter's lodge, one 3-pole which controls the incandescent system, and four 2-pole which control the 4 arc circuits.

Two of the arc circuits are on the ground floor, one on the first floor, and one on the second floor. It was found necessary to divide the ground floor into two independent circuits in order to balance the load evenly on either side of the centre wire.

The ground floor is lighted by 16 10-ampere arc lamps, divided into two circuits of 40 amperes each. The first floor is lit by 12 10-ampere arc lamps, making one circuit of 60 amperes, and the second floor is lit by 16 8-ampere arcs, making one circuit of 64 amperes.

The 162 incandescent lamps, divided into 4 circuits, are evenly divided about the centre wire. We have therefore the balance as shown in the accompanying diagram :—



Each circuit is labelled so that the whole Museum can be controlled in sections from the porter's lodge.

The Museum is, as a rule, formed with bays on each floor by the columns supporting the building, and each bay contains one arc lamp. The lamps on the second floor are less powerful than those on the other floors, owing to the ceiling being several inches lower.

The arc lamps are of the inverted type with the positive carbon below the negative, and the light is reflected on to the ceiling, which is white, by means of a conical reflector. The mechanism of the arc lamp is *above* the reflector, thereby considerably improving the appearance of the lamp, and enabling a lamp to be placed under a much lower ceiling than would otherwise be the case (Figs. 4, 5).

The lamps are enamelled white so as to be as little conspicuous as possible. They burn in pairs, and are controlled by means of branch switches arranged in groups and enclosed in cases fitted with locks. All the cases can be opened by a master key.

The third floor is lighted entirely by means of incandescent lamps. On the cases are fixed four or six curved brackets,



FIG. 5.—A similar Lamp when illuminated at night.

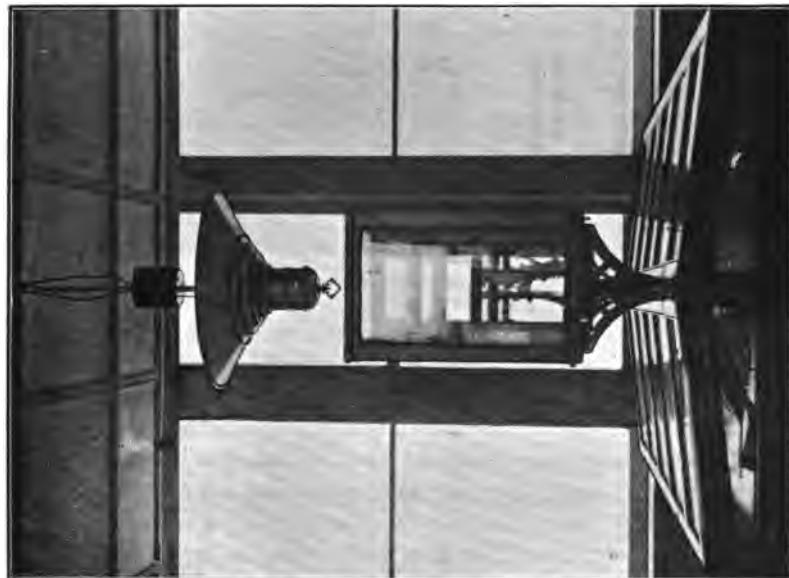


FIG. 4.—An Arc Lamp on the first floor by daylight.

according to the size of the case ; these brackets are fitted with opal shades so arranged that, as far as possible, the reflector is between the eye and the object to be inspected (Fig. 6).

The brackets are all wired with flexible conductors, which will allow of the alteration of the position of the cases should this be necessary.

The glass of the lamps is treated with a "satin finish" to prevent a glare, and thereby help the diffusion of the light ; the "satin finish" being used in place of frosting, which cuts off too



FIG. 6.—Arrangement of the Incandescent Lights on the upper floor.

large a proportion of the light, and is on that account less efficient.

The wiring is carried out in the distributing system, all fuses being placed in distribution boards. The main cables are lead-covered, and are laid in places already in existence in the building. The branch cables are vulcanised and braided, and are run in special wood casings. The section of this casing was designed to harmonise with the building—in fact, throughout our chief object has been to interfere as little as possible with the appearance of the Museum.

The distribution boards are of special pattern with all connections in the front, enabling any circuit to be disconnected without interfering with other circuits controlled from the same board.

As regards the cost of lighting, the following figures give a fairly approximate estimate :—

We have 16 8-amp. arc lamps consuming 6400 watts.

28 10-amp. arc lamps consuming 14,000 watts.

110 16-c.p. incandescent lamps consuming (in Museum proper) 7200 watts.

This gives a total consumption of

$$\frac{27,600}{1,000} \text{ units per hour,}$$

when all the lamps are lighted.

The rate agreed upon between the College authorities and the Corporation being 3½d. per unit, this gives

Approx. 28 units at 3½d. = 8s. 2d. per hour.

The arc lamps are constructed to burn for seven hours (a longer burning lamp would have been too long for the space at our disposal).

Taking the cost of carbons at 3d. per pair we have a cost of

$$\frac{44 \times 3}{7} = 1\cdot7s. \text{ per hour.}$$

This total cost is a little less than 9s. 11d. per hour.

THE CLEANING OF MUSEUMS.

By CLARA NÖRDLINGER, The Manchester Museum, Owens College.

In his book on "The Wonderful Century," Alfred Russel Wallace indulges in a delightful fantasia on the subject of "dust," and its purpose in the scheme of nature. "A world without dust," he says, "would probably be uninhabitable by people like ourselves. We should live in drenching wet, under a black sky with blinding light in the path of the sun, and almost total darkness elsewhere. In our houses we should have little light, except when the sun shone directly into them, and even then every spot out of the direct rays would be completely dark, except for light reflected from the walls. It would be necessary to have windows all round, and the walls all white, and on the north side of every house a high white wall would have to be built to reflect the light and prevent that side from being in total darkness. Even then we should have to live in a perpetual glare, or shut out the sun altogether, and use artificial light as being a far superior article."

This may be the scientific view of the function of dust, but even Alfred Russel Wallace cannot gainsay the definition of dirt as "matter in the wrong place," and the practical side of the question is, how can such matter most rapidly, efficiently, and noiselessly be relegated to its proper sphere?

Before, however, entering into the question of how best to treat the transition stages from dirt to cleanliness, it

may be well for me to say that I do not intend discussing the cleaning of the interior of the cases containing museum exhibits. A paper on this subject, entitled "Dust in Museum Cases: How to battle with it," was read at the Manchester Meeting of the Museums Association in 1892. Mine is the humbler sphere of the charwoman, the pail, the duster, and the broom.

I am, unfortunately, not acquainted with the methods of cleaning adopted in other museums, but with your permission I will give a brief description of the methods adopted in the Manchester Museum. We have three charwomen working, under the direction of the Museum porter, about eight and a half hours per day at 15s. a week each; if the need for extra cleaning arise, they are employed two hours overtime at 1s. 3d.; they are, moreover, expected to do three hours work on Sunday mornings at an extra salary of 1s. 6d.; each woman has half a day off every third week, and one week's holiday in the year. So calculating very roughly, the Manchester Museum is subjected to 8364 hours' cleaning per annum by three able-bodied and willing workers, earning wages to the aggregate amount of some £133. The result is by no means what the magnitude of these figures would lead any observer to expect. And it is this disappointment in the results which has led me to inquire further into the matter, and endeavour to evolve some more satisfactory system of cleaning.

Firstly, it seems to me the charwomen employed in museums should form a sort of auxiliary museum staff, headed not by a porter, who is always a man and frequently a bachelor, but by the oldest and ablest of their number. To her should be entrusted the necessary materials for cleaning, either in weekly or monthly instalments, and for these materials she should be held directly

responsible. Secondly, every cleaner should, on her appointment, receive a complete and suitable uniform of some dark washing material in which to perform her duties, and a sufficient number of aprons, as well as a pail, broom, &c., each of these articles to be conspicuously marked with a number and the name of the museum. This equipment would give the workers a certain pride in their position and occupation, which every one who is acquainted with the appearance of the ordinary charwoman will agree to be desirable. There should further be ample provision of dusters and cloths all marked and registered, as many a less valuable article in the museum administration.

But to proceed to the work itself, it would be well to remember that, in the matter of cleaning, the end often fails to justify the means. A general raising of dust and removal of dirt from place to place does not constitute cleanliness. In every building cleaning operations should be systematically commenced on the top storey and continued downwards, and on every floor the tops of cases should be attended to before the table cases and the floors are cleaned. For this purpose it is most desirable that water should be laid on to every floor, and some provision made for the emptying and filling of pails; and, further, that every museum should be provided with light wooden ladders fitted with padded hooks, which would bring the tops of cases within easy reach of cleaners of every stature. The advantages of washing paint and a minimum use of wood in the construction of museum stairs should also be considered from the cleaner's point of view. Further, the material and working arrangements of window blinds, which are veritable dust traps, should not be neglected, when the most important question of ventilation by means of open windows is studied. But above and before all, the cleaning to be done should be most carefully planned and divided.

Every cleaner should be responsible for a certain section of the building, and only such work as the washing down of steps and the scrubbing of large areas of floor space should be done by the workers in company.

It must also be borne in mind that the health of a museum staff may be seriously endangered by the presence of dust, especially as museum dust frequently contains particles of arsenic, corrosive sublimate, and other poisonous and irritating substances ; and one of the first considerations in the division of cleaning operations should be to provide for a judicious and efficient daily dusting of the workrooms used by the staff.

The utilisation of female labour in museums has been frequently discussed. It is a question on which the greatest museum authorities hold the most widely divergent opinions ; but wherever the charwoman reigns supreme, it seems to me but reasonable to consider her work from the feminine, and not from the masculine, point of view. The masculine mind has an instinctive horror of everything pertaining to cleaning and dusting, which is only another equivalent for upset, lost papers, and general discomfort. Then why not place this essentially feminine department of our museums in the hands of a woman ? When Professor Flinders Petrie advocated the system of a federal staff for museums, he was not thinking of the humbler offices of such an institution, nor would I even suggest the necessity for annual or biennial visits of specialists in the charging profession. But why should not lady inspectors, voluntary or professional, include museums in their rounds ? Would it not be to the advantage of all concerned if some such inspection were occasionally held, and a report submitted to the authorities ?

And, if I have not already detained you too long on this subject, will you allow me to summarise a scheme

for the cleaning of museums by drawing up a set of questions which such an inspector would be required to present in every museum she visited?

1. Who superintends the cleaning of this museum?
2. How many cleaners are employed; how many hours per week do they work, and what is their salary?
3. Is each worker provided with a suitable uniform, and the necessary materials for efficient cleaning?
4. Is there a sufficient and convenient supply of water on the various floors of the building?
5. Are the workrooms dusted every day before the arrival of the staff, and is every room provided with its proper complement of dusters, paper baskets, and so forth?
6. How often is every part of this museum thoroughly cleaned, and every gallery or exhibition-room dusted?
7. Is there in this museum a room set apart for the sole use of the cleaning staff, and is that room properly fitted with cupboards, hooks, washing sink, &c.?
8. Where, and by whom, are the soiled dusters, dust cloths, &c., washed?
9. What is the annual expenditure in this department, and how does it compare with the total annual income and annual disbursement of the museum?

THE INDIVIDUALITY OF MUSEUMS.

BY WILLIAM WHITE, The Ruskin Museum, Sheffield.

IN the administration of museums at the present time, the growing needs resulting from ever-increasing knowledge, and constant research, demand far more attention than has as yet been granted to these important centres of learning throughout the country. We are always needing facilities for, not only re-arranging, eliminating, and adding to the collections of specimens which it is our special function to fittingly set before the public, but also for developing, adapting, and expanding the methods of instruction thus adopted, as far as may be, on the lines required by the professional staffs of our Universities in the courses of lectures attended by the students in their classes. For it must be remembered that they, forming an integral part of the general, rate-paying, public, look to our museums—as they should with satisfaction—for all the help that can be afforded to them in advancing their education.

Museums should, therefore, be always provided with means for expansion and development, which means should be afforded at least as ungrudgingly as in the case of a factory, a warehouse, or other business premises, under *its* growing requirements; nay, *far more liberally*, inasmuch as, in the latter case, the demands are directed more to selfish personal aggrandisement, and the greed of mammon, than to the public weal.

Museums, then, instead of being looked upon as if they were a questionable advantage to the public, or as necessary

evils that are best starved down, should be allowed the fullest scope, and every encouragement should be afforded to the directors and custodians who are responsible for the arrangement of the collections.

In the work of a museum there is no more finality than there is in a business, or in knowledge itself. In its very essence and nature it is never complete; and, in its original design, it should clearly, therefore, have ample provision afforded for subsequent additions in the form of wings, which may be built on as they may be required, under growing needs, at different periods. It is altogether impossible to estimate, or over-rate, the importance to a populace of a properly equipped and really efficient museum as an intellectual centre in every civilised community.

Whether the *scope* of museums should be as universal as it has hitherto been supposed feasible is the main question which I now propose to discuss, with the view of discovering to what extent we can legitimately restrict, alter, and adapt the uses of these institutions.* And, without wishing to lose sight, even for a moment, of the stern facts which confront and beset all but those who may be in the enviable position of being able to plan out afresh their own ideal structure of a museum, I want to consider at the same time whether some different system of treatment may not be introduced into museums, as a thoroughly practical measure under even existing circumstances.

The common fallacy of still attempting to form a collection of objects which, theoretically at all events, shall be universal in representation, within the limited scope of a single restricted building, is one that has frequently been

* In my paper on the "The Function of Museums," published in the Report of the Museums Association for 1893, I first broached this subject of the important difference that needs to be recognised between a national museum and a local or provincial museum. See pp. 85-86 of the Report referred to.

strongly deprecated in recent years as futile and absurd. Apart altogether, however, from the impossibility of absolute perfection, which can be attempted as a distinct aim of purpose only in a vast *national* collection, I wish to briefly point out the inadvisability of such an endeavour in local provincial museums. The common fault to be found in "local" museums in general—due entirely to the utter lack of method in former times, which has so much hampered the movements of later officials in charge—consists in the similarity that exists between them, whereby one cannot commonly discover anything that *may* be fresh, or of special interest, among the heterogeneous quantity of things which we are already tired of seeing. I am fully aware, of course, of the endeavours that have been, and are still being made to introduce methods of identifying "type specimens," and so on; but even in this aim the lack of uniformity that prevails among the various museums renders such attempts too troublesome to be useful, even to the experts who have special aptitude for identification work.

Each museum in the country ought, I think, to aim, instead, at some *individuality*—something distinctly different from other museums, something which shall stamp it with its own special character.

In the early days of our childhood there used to be those deplorable exhibitions which we are now ashamed to think of; but in more advanced times, and with increased experience, and the many possibilities of ascertaining the actual living appearance of such things as lions and elephants, and crocodiles, now afforded to every schoolboy, there is no longer any need for such cumbrous objects, even if well stuffed, as we know they very rarely are. It is not closely-packed series of stiff and awkward-looking animals that we want, which teach nothing that cannot be now better learnt from well-illustrated natural history books, but as

few typical examples as possible, fully explained, so as to teach as *much* as possible concisely. Let us try to forgive and forget the sins of our local fathers, who gave us such an inheritance, and see what can be done in the way of re-adjustment and re-arrangement of the galleries. The elimination of all useless and worn-out old specimens affords, of course, the delightful opportunity of a healthy weeding-out of even those time-honoured specimens "presented by the late Mr. Jones of the Philosophical Society," which in the recesses of our hearts we all yearn to effect, though we dare not suggest it.

As observed in the paper already alluded to, I consider that every local museum should deal primarily with its *local needs* and its *local environment*. The special arts and industries of the locality are of the highest importance to the inhabitants of the neighbourhood, and of the greatest interest to visitors to the district from distant parts. In direct connection with the industrial occupations, we also need to demonstrate the local mineral products, and the geological formations, with their accompanying fossil remains; the land and water plants, shells, insects, birds, mammals, and general flora and fauna of the neighbourhood, or county. If it be found possible to do more than this, we may then proceed to deal with some special subject, or subjects, in a thorough and interesting manner.

I have said that we should *individualise* our museums, and will now explain my meaning more clearly. Some years ago—in the pages of *Nature*, I think—I suggested that, in addition to the Linnean Society, it might be well if a Darwinian Society were instituted. Why can we not, at all events, in various ways apply and demonstrate the principles discovered by Darwin and Wallace more specifically than has even already been done in some museums? What has been accomplished so admirably in the British Museum

"Index" series, and in the Dublin Museum, may be carried out with variations elsewhere. For instance, one museum might specialise in the direction of illustrating the affinities of species; another could exemplify the influence of environment upon the external characters of insects, reptiles, fishes, and other animals; another might deal with the geographical distribution of plants and animals; in another museum, on the East Coast, the migration of birds might be treated; elsewhere again, single genera or families of birds could be illustrated; typical examples of birds might be shown in relation to their surroundings, the male displaying his full spring plumage, or singing, the hen sitting obscurely on her nest; the expansion, and different forms of their wings in flight is another subject, which was suggested by Mr. Ruskin for treatment nearly twenty years ago; the development and variation of secondary sexual characters in insects is another very extensive subject for interesting illustration—both the upper and under sides of the wings of each sex being in every case exhibited, and no species introduced unless its early stages can be also compared; the venation of the scale-denuded wings of butterflies and moths is a subject similarly awaiting fuller investigation; the growth of seedlings, of leaves, blossoms and fruit, branches and trees, is another entrancing subject to be dealt with, by means of careful drawings, in the manner of the delightful illustrations first produced on the subject in "Modern Painters," by Mr. Ruskin; the extent of variation of species under domestication; and the contrivances of fertilisation in plants; while the disposition of all the feathers upon the body of a single bird, such as a peacock, displayed in their ordered series, would form a grand subject for a lovely object-lesson. Numerous other fascinating subjects might be suggested without end, as most fruitful lines of investigation, and elaborate treatment. Such exhibitions as these would

prove a delightful attraction to visitors, far and near, and be the means of at once interesting people in the study of Nature, and inducing them to observe, and enjoy, the life of the fields and woods around them, as they are utterly incapable of at present.

The possibility of carrying out such plans as these, without needless repetitions, or unnecessary competition between different museums, is greatly facilitated by the operations of the Museums Association, the annual re-unions in different towns affording excellent opportunities for comparing notes, and establishing friendly co-operation.

As an illustration of what can be done by individual effort in entirely new directions of study, I will now instance what was planned, and commenced by Professor Ruskin in connection with his museum,* and what has been further accomplished since, in accordance with his views.

But, in case I should be misunderstood in my use of the word "individuality," I must state that I do not wish to imply thereby any connection with individual *persons*. On the contrary, it is so usual for museum collections formed by single individuals to be looked at askance, and generally considered—sometimes with justice—as only the fanciful freaks of faddists, that, quite mistakenly, Professor Ruskin laid himself open, as he was well aware, to suspicions of this character. It may, indeed, be doubted whether private individuals are, at all generally, capable of exercising discretion in their collecting, with sufficient judgment and authority, unless really better experts than they have supposed themselves to be, to claim any right to public attention ; and in the majority of cases we know that there is most certainly, among amateurs, an equal lack of both

* On this, see "The Function of Museums as considered by Mr. Ruskin," already referred to (Report for 1893), and my paper on "Museum Libraries" (1895).

knowledge and opportunity. I do not mean to say that there are not exceptions to the rule, though they must ever be of the rarest order ; and the necessary conditions for success must combine the proper *facilities* for effecting the purposes of the collection with the highest *faculties* requisite for defining such purposes. I have no hesitation in saying that what we may distinguish as "personal collections" have almost invariably proved to be utterly unfortunate and injurious exhibitions, savouring more of mere curiosity shows in character, such as—to name no other—Madame Tussaud's, or Barnum and Bailey's exhibition of freaks, than of museums properly so-called. Such imitations of genuine centres of instruction deserve only to be failures, instead of the successes they appear to be from a financial point of view.

Under the category of "private collections" I do not, of course, include such specific collections of technical value as those formed by Lord Rothschild, Canon Norman, Lord Walsingham, Messrs. Godman and Salvin, Mr. Henry Willett, and the late Mr. Booth of Brighton ; nor such valuable gifts by bequest to the nation as those which have been added to the museums at South Kensington and Bloomsbury, or of the Universities of Oxford and Cambridge. I mean such instances as those which Professor Newton and others have so ably described in their contributions to the Museums Association's literature of former years. How many misguided collectors have done positive harm in the world by their unfortunate mania of indiscriminate collecting !

Far otherwise were the conditions and circumstances under which Professor Ruskin gave practical form to the method of education which he devised, in connection with his teachings, on the vital associations between Art and Nature. For this is the main argument of Mr. Ruskin's

writings, to show the relations existing between what we express as "Art" with the significances embodied in what we as vaguely term "Nature," or "the powers of Nature." It is, indeed, the philosophical focussing-point determining the essences of things, the common meeting-ground of the powers of man and the powers of Nature, the life in both that we call "God." This, in truth, it is that Mr. Ruskin has tried to bring clearly before us, and to demonstrate in a realistic and concrete manner in his museum.

With him nothing but the choicest examples obtainable are to be held up to view, nothing but what is as near perfection in its type as may be secured: that such illustrations only can serve as reliable indices to a right understanding of its characteristic essence and nature, or to the true interpretation of its history, as can be discovered.

Whatever is essentially beautiful in the work of man—the product of a nobly inspired genius, whether it be in the form of a building, a piece of sculpture, a painting, a poem—the book, as it were, of his endless life—that, if anything, Mr. Ruskin felt, is worthy of preservation, not as the record of his hand-work merely, but of his spiritual nature in its pure crystallized state, and to be studied as any other crystal, in relation to its environment. Similarly, whatever is essentially lovely in the world of Nature outside man, the product of minute or mighty silent forces, whether operating in the form of alps, a piece of moss, a sunset, a blossom—the book of the revelation of *its* inherent life—that is worthy of record, not as mere material compounds that may be submitted to analysis, or decomposed into dust and vapour, but as the reflection of the mind that is also in our nature, and diffused in our vital constitution, precisely to the extent of the capacity for receiving such impressions that may be at our command. Surely such an ideal aspect

of the philosophy of life as this is most deserving of being realised in a home of the Muses.

But how is it possible, it may be asked, for such a conception of life as this, to be treated in a systematic manner in a museum?

I cannot attempt, on such an occasion as this, to do justice to a subject so deep and absorbing. A philosophical treatise would, indeed, be out of place, and I must limit myself to dealing with the tangible and concrete things to which Mr. Ruskin has given shape and substance.

Let me here remark that there have been, not unnaturally, constant misunderstandings and misrepresentations of Mr. Ruskin's high aims and deep purposes, and frequently also wilful misconceptions, which can only be excused as the result of ignorance of the author's writings, and a lack of opportunity of learning the real facts of the case. Only those who have made it their studious business to ascertain the precise scope and bounds of Mr. Ruskin's entire scheme of operations in connection with the St. George's Guild in all its bearings, are in a position to offer any opinions on the subject, and theirs only can be accepted as of authoritative value.

I need scarcely state that I have critically studied all Mr. Ruskin's writings repeatedly, not only during the eight and a half years of my special connection with his work, but, I may say, most of my life; otherwise I should not, I suppose, have been pressed into undertaking the really difficult and responsible task of expounding his teaching in this practical manner, and of bringing what was formerly chaos, into something like order.

In such a connection, it was of course an absolute necessity for me to sink my own individuality entirely, and hiding myself behind Mr. Ruskin, as it were, to represent him only in all concerns of the Museum. With-

out wishing now to intrude myself unduly, I will proceed to describe, as impersonally as possible, the peculiar needs in such a case as this, and the precaution that was necessary lest the integrity of the original purposes of the Museum should be in the least tampered with, or perverted irreparably, from its proper course.

It has been necessary for me to specially study afresh such abstruse subjects as the constitution and development of mineral forms ; to cover most of Mr. Ruskin's ground in Italy, with the object of directly studying on the spot the ancient art and architecture of the chief towns ; and to spare no pains in arriving at a complete detailed knowledge of what the Professor really intended, as was discoverable only by out-of-the-way research, and unpublished information in correspondence, &c. So that, I think, I may say that I have succeeded in arriving at almost as much knowledge of his scheme and system as Professor Ruskin himself, and can give chapter and verse for everything.

I consider, that while it is most desirable Mr. Ruskin's purpose in instituting such a museum should be respected to the utmost extent of fully realising all his brightest and most ardent hopes with regard to its development, by enriching the collection with as complete illustration of his teaching as possible, nothing should be admitted into the collection but what he would, without any question, heartily approve.

In one direction only can I possibly advocate anything like disregard of the founder's personal feelings, and that is with regard to his own personality in connection with it. The adopted name by which the Museum is most generally known is not that given to it by Professor Ruskin himself. It was formally designated "The St. George's Museum" during its stay in the suburb of Walkley, as the property of the St. George's Guild, which of course it still remains,

under its loan to the Sheffield Corporation ; and it was not until the removal of a portion of the collection to Meersbrook Hall that the better understood designation became officially recognised. Mr. Ruskin always strongly objected to allowing his name to be incorporated with any operations he had in hand. When people first started Ruskin Societies in different localities, he wrote desiring them not to use his name in connection with them—“Call your society, instead, ‘The Society of the Rose,’ for no true disciple of mine,” he said, “will ever be a ‘Ruskinian’; he will follow, not me, but the instincts of his own soul, and the guidance of its Creator.” Similarly, at Oxford, it was hoped by the Professor that the Art School which he formed there would become an integral part of the University itself; but, as in the case of the so-called “Ruskin School” at Oxford, it is only right and proper that the name of the founder of the Guild should be attached to its special institution ; and particularly so since the visible expression of his active industry thus concentrated must now become ultimately the only fitting national memorial to his greatness, and the centre of his teaching.

Permit me, at the same time, however, to expressly state that there is no encouragement thus given to mere “hero worship,” nor any maudlin sentimentality of an unpractical foolish kind. It is essentially a centre of noble instruction, not of any outlandish “cult,” but in sound wisdom and understanding ; it is not an altar or a shrine for blind ignorance to pay devotion to, but a place for students to THINK in. And, I need to add also, that the term “Master,” as applied too freely by some enthusiastic followers outside the Guild, should properly be used only in relation to his mastership, as in the case of the Cutlers’ Company, and other such guilds.

Sir William Flower's oft-quoted theoretical definition of a museum was here really more than anticipated in practice, for, if I were asked to describe the nature of the collections comprised in the Ruskin Museum, I should say that the pictures, drawings, engravings, photographs, casts, minerals, coins, medals, MSS., etc., are there to serve as special illustrations of the writings contained in the library around which they are concentrated, and with particular reference to Professor Ruskin's own sixty or seventy volumes.

While it was a leading principle which Mr. Ruskin observed in connection with his St. George's Museum that the number of illustrative objects should be restricted as far as possible, it is not known to more than a few outside the circle of the Guild that Mr. Ruskin, as its master, found by experience great difficulty in restricting the choice of the *best* books (more than any circumscribed "one hundred," to answer the purposes of an editor!) in all departments of literature, and the bounds of inclusiveness were practically decided more by the limitation in the supply of funds for the purpose than anything else.

It was, for instance, Mr. Ruskin's enthusiastic but delusive hope, as the result of a strong appeal to the public—following the lavish expenditure of his own fortune—to be able to expend as many thousands of pounds at the great Blenheim Library sale as should be placed at his disposal for this public service; and very much more could have been done in similar ways if the means had been forthcoming. Such being the case, it is now, I think, not wise to generalise further in the manner intended by the founder himself; and many objects that have been offered as donations, if not returned at once with thanks to the senders, have been put on one side, apart from the main collection, and not even entered (except privately) as belonging to it.

There are, on the other hand, very many items that Mr. Ruskin has specially described as desirable possessions, which need to be obtained as the generally rare opportunities are afforded. It is unnecessary to deal further with this point than to say that my own conservative opinion in the matter is, that in such a collection as this, a representation of every picture, of every building, and particular studies of portions of such pictures and buildings, and sculptural details, etc., which have been dealt with by Mr. Ruskin in his writings, should be here in evidence—generally by means of photography, as advocated by him—as further illustrations to those which he was able to include as engraved plates accompanying the published text in his volumes. This means a very great deal of continuous application and difficult work, as Professor Ruskin's aphorism that "the teaching of Art is the teaching of all things" very largely applies to his literature, which may be aptly described as a little world in itself.

Much of my time is frequently occupied in annotating and making cross-references to Mr. Ruskin's writings, and in making extracts from them to accompany all these illustrations.

Mention should also be here made of the large illustrated volume which the Corporation of Sheffield published a few years ago, in which I gave an embodiment of "The Principles of Art," as taught by Professor Ruskin—which work was alluded to in one of the Museums Association Reports as a new departure in connection with museums. By way of further illustration to that volume, the Trustees of the St George's Guild have since issued a series of photographic reproductions of the numerous pictures and drawings contained in their collection, which are kept on sale at the Museum, and supplied by post to applicants at

a distance. The demand for these has warranted a considerable extension of the series, which now comprises about a hundred subjects.

Professor Ruskin, himself, for several years employed, on behalf of the Guild, a band of specially trained artists, whom he sent abroad to prosecute the work he required in various old continental centres of art and learning, and those who are still available have been similarly employed occasionally and, as far as possible, by the Trustees, in continuance of his object. It was his habit, also, to have large photographs taken specially for him, as, for instance, the fine and extensive series of representations of choice sculpture at Amiens and at Rouen Cathedrals, and which were not otherwise obtainable. Similarly, among the hundreds of photographs which have already been secured with difficulty, is a complete series of the carved capitals of the Ducal Palace at Venice; but very much remains to be done, in this and other such ways, before even my present requisition lists are exhausted.

It is a surprise to all visitors to the Museum who are acquainted with Mr. Ruskin's writings to find at present only a single original example by the great artist whom the Oxford graduate first championed throughout his five volumes of "Modern Painters," and elsewhere; and that one, by no means a representative illustration of Turner's work, being an early water-colour view of Sheffield as seen from Meersbrook Hall a hundred years ago, when the artist was only twenty years of age, and which the Corporation of Sheffield purchased recently. Nor were there any of the lovely series of Turner engravings, excepting the "Rivers of France," and the views in England and Wales, nor more than a few plates of his "Liber Studiorum"—instead of the entire series—until recent years; and as yet there is not a single original representa-

tion of the work of either Samuel Prout or William Hunt in the collection, although their works have been rendered famous mainly through Mr. Ruskin's praises.*

Finally, with regard to the collection of minerals, which was but the nucleus of what Mr. Ruskin intended it to be, very important additions to the Walkley series were made by the Trustees as a further instalment, from a store in reserve elsewhere; and we have since continued to fill many gaps in further illustration and exposition in a highly interesting manner. It is not generally known, I believe, that, in addition to his having written, at the request of the British Museum authorities, a "Catalogue of Siliceous Minerals," most of which were presented by Mr. Ruskin himself to the nation, he has also privately printed at different times similar descriptive catalogues of two choice general collections of minerals which he presented to the Museum of Kirkcudbright, and the St. David's School at Reigate, respectively; while a fourth catalogue, of the St. George's collection, reached no further than the proof state, when ill-health prevented Mr. Ruskin from continuing his self-imposed task. This, however, I have already greatly extended in manuscript for the use of students, and it may possibly be published eventually, in the manner expressly intended by Mr. Ruskin, either by the Trustees or privately, as an introduction to the study of minerals.

In concluding these too disjointed remarks, I hope that I have shown the value there may be in museums which possess a distinct individuality. I do not, as I have already said, advocate an extension in the direction of *personal* museums, which are always liable to abuses and difficulties

* It will be remembered that, under the auspices of the Fine Art Society, a special exhibition of drawings by these artists was held in winter of 1879-80, Mr. Ruskin being induced to write the descriptive catalogue.

of various kinds On the contrary, I wish rather to bring forward the importance of what Mr. Ruskin himself realised in urging the necessity of formulating a distinct methodical system, established upon a firm basis of well-ascertained, and well-assured principles.

PRACTICAL NOTES, AND SUGGESTIONS ON MODES OF EXHIBITING MUSEUM SPECIMENS.

BY WILLIAM WHITE, The Ruskin Museum, Sheffield.

FOR the benefit of the custodians of museums and art galleries visiting the Ruskin Museum in connection with this annual conference, I will briefly point out the special methods of displaying objects of various kinds I have put into practice which I know to be original, and which I believe have not as yet been introduced anywhere else. If any of them meet with your approval, I need hardly say that you are perfectly welcome to adopt them yourselves.

With regard to the setting forth of everything preserved in museums, Mr. Ruskin has said:—"Above all, let all things for popular use be *beautifully* exhibited. In our own houses, we may have our drawers and bookcases as rough as we please; but to teach our people rightly, we must make it a true joy to them to see the pretty things we have to show; and we must let them feel that although by poverty they may be compelled to the pain of labour, they need not, by poverty, be debarred from the felicity and the brightness of rest; nor see the work of great artists, or of the great powers of nature, disgraced by commonness, and vileness, in the manner of setting them forth. Stateliness, splendour, and order are, above all things, needful in places dedicated to the highest labours of thought. What we willingly concede to the graces of

society, we must reverently offer to the muses of seclusion; and out of the millions spent annually to give attractiveness to folly, we may spare at least what is necessary to give honour to instruction.”*

MINERALS.—The cabinets themselves, you will doubtless have observed at a glance, are *not* such as one can recommend for the purpose. They were made, I should like to explain, without my having been shown the design, and the main idea was, evidently, solely in relation to their appearance as articles of furniture. We all know the trouble, annoyance, and waste of time involved by cabinets that are not thoroughly dust-proof. These very costly “articles of furniture,” which we must admit are handsome enough in appearance, are notwithstanding really very badly constructed, almost impossible to move from their places, and might well have been patented as improved dust-catchers. It is usual, I believe, to make the best of a bad job, and after repeated doctorings by the makers themselves and others, I have struggled to get them at least dust-proof, as far as possible, except the drawers, which are hopeless. The means adopted are by fastening double velvet linings round the doors, so that the “pile” of the velvet on one edge interlocks with that of the strip on the other edge, through which little dust can filter, *if* the fit be quite perfect. The glass shelves—than which no worse material could possibly be devised for minerals, as the supposed transparency is, of course, nullified by the opaque objects, and trays that are necessary to prevent them from sliding—are in the course of being replaced by wooden ones, which I am arranging in such a way as to avoid shadows as fully as possible. In the upright central portions of the cabinets the plan of the tiers is somewhat that of the boughs of trees, whereby the light is distributed

* “Deucalion,” pp. 150-151.

to the best advantage, partly *behind* the shelves, and arranged at such levels as to prevent the obscuration of any of the specimens ; the upper shelves being slightly sloped for the purpose. The shelves and bottoms of the cases, and of the drawers, are lined with plush of a suitable colour, varying with the objects.

Next I will invite you to inspect a new method I have adopted for fixing the specimens in the drawers without their shifting. None of the usual methods appeared to me satisfactory, as, whether the minerals be held in place by pins, wired down, or glued to blocks, they cannot then be taken out, when wanted, for complete examination. I therefore conceived the idea of introducing a false bottom to the drawers of $\frac{1}{4}$ -inch deal, raised a little at the sides by means of strips of wood ; then, after placing the specimens on it in the exact positions they are to occupy, the contact parts of their bases are pencilled round, and cut out with a fret saw, that they may fall through sufficiently to be held quite firmly, and yet be quite readily removed for demonstration purposes at any time. The prepared board is finally covered with plush or velvet of the most suitable colour to show up the specimens, and the drawers may be pulled out and in, even roughly, without the least fear of displacement. The process is certainly a laborious one, but it is thoroughly effective and satisfactory. The method possesses the further advantage that no intermediate examples can be crowded in ; separate drawers must be reserved for additions, in the form of an appendix, or some of them, at least, may be included on the shelves of the cases above. In the matter of labelling, I consider that in the case of a special collection such as this, the fewer explanations there are the better. Those who wish to study should have assistance readily afforded them ; but

it is better for the general public, I think, not to suppose that a few words on a label can tell them everything about it, while the series may be so arranged as to lead on directly from one to another, for all to follow as clearly as printed text in a book.

With regard to the debated question of the classification of minerals, I need, perhaps, say no more now than that the arrangement—in practical realisation of Mr. Ruskin's own treatment of the subject—is neither a purely chemical one, nor a crystallographical one, but a combination of all the various aspects and considerations that may be brought to bear upon the different minerals taken together: full illustrations being provided of their elementary properties, modes of occurrence (essential or accidental), their affinities, processes of development, metamorphosis, and analogues.

ARCHITECTURAL CASTS.—These are first secured by means of embedded back-nuts, let into the plaster, into two oak cross-beams, which are then fastened (after being covered with a dark green, or crimson, cloth of fine texture, as are the rough edges of the cast, and the interior of the case) to the back of the specially made oak case, or frame, the front of which is, of course, glazed with a gold slip round inside. This method of mounting adds greatly to the features of the sculpture, while it hides completely the obnoxious artifices necessary to its perfect security. The frames are hung on the wall by sufficiently strong copper wire or chains, or, if too heavy unsupported, with brackets added below, driven into plugs let into the wall. The great advantage of these casts, which were specially taken for Mr. Ruskin, is, as he has pointed out, that the sculpture can thus be seen far better, for the purposes of study, than even in its position in the building it adorns.

THE PICTURE GALLERY.—The best mode of hanging pictures is, in my opinion, by means of “glass plates”

and screws fastened to timber beams let into the brick-work of the walls, at intervals of about a foot apart. This method was not adopted in the arrangements here, however, the work of the decorator having been decided upon previous to my having undertaken the function of administrator. The pictures are hung from an ordinary picture-rod fixed below the frieze by hooks and brass wire, which arrangement does not admit of the least current of air being permitted in the room without causing the pictures to swing and flap against the walls. The inconvenience in the arranging of the pictures, when thus suspended, is much increased, and complicated, by the projection of the wires from the walls, which difficulty is constant wherever (as here) the pictures are periodically changed, in irregular series of connected subjects. As few pictures are placed above another as possible, and then not high enough to be beyond proper view, it being understood that every worthy work of art should be hung "on the line," so as to admit of close examination, unless produced with a view to more distant effect. For lack of wall space, screens have been brought into requisition, where otherwise seats would be more amply provided than at present.

I will next direct your attention to another innovation. The matter of labelling pictures is not always a simple one, especially if the subjects require more than a brief explanation; something more than a printed label is then necessary. But I would mention, in passing, that I have recently introduced labels of a stout brown paper (which it is not easy to obtain clear enough from spots), the tone harmonising exactly with the stencilled walls, the precise width of the frames (and fastened behind with drawing pins), thus avoiding the patchy effect of smaller labels, and admitting of a fuller description, which is printed in mixed heavy types, in a good black colour. This is a great

improvement upon the troublesome white paint method on cardboard which formerly I had to resort to, and which requires constant renewal. But the pictures and drawings here being of a special nature, consisting frequently of studies of portions of pictures, or buildings, or sculptured decorations, in illustration of Professor Ruskin's works and teaching, it was necessary, I found, to go further still. Not much information, after all, of all that needs to be explained can be supplied on a label, however large it may reasonably be. So I had recourse to obtaining some specially made cloth covers—as supplied for magazines by the Library Bureau—to contain printed accounts of each series of pictures grouped on the walls, extracted from my published volume on "The Principles of Art," the necessary leaves from which could be easily changed in accompaniment with the pictures. Only those portions of the book which serve to explain the various productions under exhibition is, of course, in use at any one time; and these few leaves or booklets are freely distributed around the room in a perfectly orderly, and not unsightly manner, being suspended by a short chain to a wooden ring which slides silently along a wooden rod (fastened inconspicuously over the line of the dado), below each series of subjects.

Another method which I have under preparation, in connection with the work of Carpaccio, in a separate room, is in the form of a shelf running round the room below the pictures, the printed text from "The Principles of Art" and Mr. Ruskin's fuller explanation in various volumes intermixed, mounted in brown-paper openings, and covered with glass. But, although I have spent many months in scheming and carrying out this arrangement, I am by no means so satisfied that it will prove an unqualified success in operation; though, of course, if people do not

wish to read what is provided, that is no fault of those who provide it for their use.

THE LIBRARY.—Several members of the Association, I am aware, have charge of, or are connected in some way, with a library also; and I have, on a former occasion, advocated the attachment of a special student's library to every museum. Here I have only one item of practical interest to show you, and which is, I am told, in use at present in only one other place in the kingdom, namely, at Liverpool, but the working of that I have not seen. Large and heavy volumes, we know, are not only unwieldy things when kept on shelves, whether they be placed on their sides or on end ; in either case their bindings are subjected to considerable injury through the friction and their weight, while, if there be any loose sheets, or plates inserted in them, the contents are liable to further damage when set upright. For instance, we have here a set of about forty large portfolio volumes, containing what is, I believe, the most extensive and finest collection of plates of birds anywhere to be found—most of them hand-coloured, and many original drawings among them also—this being Professor Ruskin's method of treating natural history subjects, as described in the Rev. H. H. Higgin's presidential address in 1890. The plates are kept loose between brown paper leaves, in half-calf binding, and it would not do, of course, for these volumes to be placed on end ; while, if each had a shelf to itself, there would still be the rubbing of the side laid down. In the place of shelves, therefore, I have introduced, in a specially-made case, small wooden rollers, three for each volume, fixed on brass pivots, grooves being cut in the sides of the cases to admit the brass fittings, set at a *slight* slope downward towards the back, to prevent the books from pitching forward by themselves. The rollers are covered with dark-green cloth, and in this way even

the choicest bindings might be kept without receiving the slightest injury in use whatever, the revolving roller avoiding all friction and turning so easily that the volumes may be drawn forward by a single finger. The method proved so satisfactory that I have had the shelves in six other divisions taken out and replaced by sets of rollers, to receive portfolios and other large-sized volumes, such as Gould's ornithological works. The question of extra cost is not worthy of consideration in any such case, since if choice productions are worthy of being retained in a library, they should surely be worthily preserved by those who undertake the charge of them.

DRAWINGS, ETC.—Original pen or pencil drawings and valuable engravings, such as those by Albrecht Dürer, or after J. M. W. Turner, are best preserved in portfolios kept in the drawers of special cabinets, with leather tops, upon which the portfolios may be laid during examination. The drawings and engravings themselves should be lightly "tacked" at the top or side only, within folding cardboard mounts, linen-jointed, so that they may be preserved in their integrity, and rendering it impossible for the surfaces of the production to be rubbed. A complete set of Turner's "Liber Studiorum" is kept in full-morocco solander cases, with fall-down fronts, padded and lined inside with moiré antique silk, and fitted with brass hinges and lock and key to each.

FRAMED DRAWINGS IN RESERVE.—The excellent method of keeping drawings held in reserve which Mr. Ruskin devised, is that which he introduced into the National Gallery, in connection with the valuable Turner bequest of water-colour drawings, and similarly adopted by him in his Art School at Oxford. The mounted drawings are kept in numbered frames of holly, or other white wood, with sliding backs, and hollowed

grooves on the sides, which fit on the corresponding runners in the closed mahogany cabinets which contain them. Other drawings are placed in lightly constructed oak frames, which slide into grooved oak cases of a simpler kind. To bring all of these drawings into occasional use in turn on the walls and screens of the public gallery, I have fitted the frames with specially-made brass eyelets let into the wood, and hinged so that they can be folded back flatly to admit of their return at once to their places in the cabinets.

The photographs of pictures, architecture, &c., are mounted in solid sunk mounts, and kept in glass-topped drawers in a mahogany cabinet formerly used for minerals.

MARINE ANIMALS MOUNTED AS TRANSPARENCIES FOR MUSEUM PURPOSES.

By H. C. SORBY, LL.D., F.R.S.

If I had not been so far from Sheffield and occupied with studies which I did not like to break off at the best season of the year, it would have given me much pleasure to have taken part in the meeting of the Museums Association. Since Mr. Howarth wished some of my specimens to be shown, I left a series in his hands, and wrote a paper to explain some particulars respecting them. I, however, need not say much, since many of the objects will explain themselves.

The special advantages that may be claimed for animals mounted on Canada balsam as transparencies is that they show not only the general form as seen in those preserved in spirit, but, by being made more transparent, they show much of their internal structure and how one part is related to another. This may be sometimes advantageously supplemented by partial dissection. The general structure may also be further exhibited by appropriate staining, which may show distinctly what is very imperfectly visible when they are in a natural condition. Partial bleaching is also sometimes very useful. It is not my intention to describe all the processes needful in particular cases, since these vary so much, and one which succeeds admirably with one kind of animal may totally fail in another closely allied to it. The chief difficulty is to find out what is

wanted in each case, since what might be looked upon as a trivial difference may alter failure into success. The effect of re-agents on different kinds of closely allied animals is sometimes most surprising, and seems to make it probable that there is some great differences in chemical composition as well as in mechanical structure. One of the most important considerations is how to kill the animals without either general or irregular contraction, and to obtain them in such a condition that, though limp enough to be arranged properly on the glass, they will not decompose in any part before finally dry. This can be done in some most unpromising cases, and I am now doing my best to find out how to do it in others. In all cases the animals are carefully spread out on the glass, so as to show their form and structure to the greatest advantage, then quickly dried at the ordinary temperature, soaked in benzol, and finally another glass mounted over them with Canada balsam. Being thus soaked with and embedded in balsam, they have no tendency to decompose or turn mouldy, or to be attacked by mites. Most of my specimens have been kept in the dark, but even some which have been exposed to the light for several years in the cases of the Sheffield Public Museum are still in good condition ; and, as far as present experience enables me to decide, properly mounted animals may keep for an indefinitely long time. My aim has been to prepare them for my own use as lantern slides, but for museum purposes it would be better to mount some animals on larger glasses than the usual $3\frac{1}{2}$ inches square. Some of my specimens, selected to illustrate the general subject, will be exhibited by Mr. Howarth. Of course, the aim has always been to arrange the animals so as to show their characters to the best advantage, and in the case of some soft-bodied animals it is possible to display them in a much more satisfactory manner than

when they are preserved in spirit. I have also succeeded very well in retaining permanently colours otherwise rapidly lost, as for example the red purple of some species of *Eolis*, the brown markings of some medusæ, and the red colour of the blood of many worms in the well-defined vessels.

As examples of anatomical structure, which is scarcely if at all visible in animals kept in spirit, I would refer to the mounted Plaice, which was first kept in formalin and then partially bleached in diluted sulphurous acid. This shows the blood vessels to great advantage, as well as other particulars not seen when preserved in spirit. Some of the crustacea also show fairly well the muscles in the legs, and the structure of the joints and of the body.

The advantage of appropriate staining is well seen in the case of medusæ, different organs taking the stain to a very different extent, so that the anatomy is well displayed. *Priapulus* partly dissected and stained shows well the different internal organs and the muscular structures of the body wall.

The chief objection to the method is that the preparation of transparencies involves much more time and care than putting specimens into spirit, but, as a compensation, they not only have the above-named advantages, but can be used so successfully as lantern slides.

THE ETHNOLOGICAL ARRANGEMENT OF ARCHÆOLOGICAL MATERIAL.

BY HARLAN I. SMITH, American Museum of Natural History,
New York, U.S.A.

ARCHÆOLOGY is a method of reconstructing, from scant remains, the ethnology of a people now gone, and of whom we can learn only from such of their remains as have endured the test of time.

In the summer of 1895 I made a collection for the American Museum of Natural History, at an ancient village site and burial place near May's Lick, Kentucky. This collection I have attempted to arrange at the Museum, in a manner intended to show the tribal life and ethnology of those ancient villagers. It is believed that this method, with modifications to suit local differences, is well adapted to arranging archæological material from various regions. By using such a classification in field-work, material may be collected that would otherwise be overlooked or discarded as of no value. Objects showing no traces of art, or seeming too crude or common to be saved, such as burned stone, fish bones, or charcoal, would by such a scheme be preserved. It is believed that this method, while it may have been held in theory, has not previously been employed. The method takes one far from the old way of giving prominence to a single specimen, and makes the specimens serve to solve a problem or illustrate a fact.

The following is an outline of the classification, which might require modification for other regions, and extension for more complete collections :—

I.—Physical Characteristics ; shown by bones.

1. Osteological remains.
2. Artificial deformations.

II.—Foods ; suggested by remains found in refuse of camp fires, as—

- | | | |
|-------------------|---|-----------------------------|
| 1. Deer, | } | Shown by bones. |
| 2. Bear, | | |
| 3. Turkey, | | |
| 4. Raccoon, | | |
| 5. Opossum, | | |
| 6. Fish, | } | Shown by shells. |
| 7. Clams, - - - | | |
| 8. Beans, | | |
| 9. Corn, | | |
| 10. Walnuts, | } | Shown by charred specimens. |
| 11. Hickory-nuts, | | |

III.—Activities ; shown by articles of—

1. Warfare—
 - (a) spear points.
 - (b) arrow points.
 - (c) club heads, &c.
2. Hunting—
 - (a) arrow points.
 - (b) spear points, &c.
3. Fishing—
 - (a) fish spears.
 - (b) bone fish-hooks, &c.
4. Domestic life—
 - (a) fragments of pottery, burned rocks, soot on pots, &c.,
 - (b) shell spoons.

IV.—Manufactures ; shown by specimens classified by material, as—

1. Stone—

- (a) arrow points.
- (b) spear points.
- (c) knife points.
- (d) drill points.
- (e) axes.
- (f) chisels.
- (g) hammers.
- (h) grinders.
- (i) pestles.
- (k) mortars.
- (l) pipes, &c.

2. Copper—

- (a) ornaments.
- (b) awls, &c.

3. Clay—

- (a) pottery fragments.
- (b) dishes.
- (c) figures.
- (d) discs, &c.

4. Bone—

- (a) awls.
- (b) spear points.
- (c) fish-hooks, &c.

5. Shell—

- (a) beads.
- (b) pendants.
- (c) discs.
- (d) spoons.
- (e) scrapers, &c.

6. Vegetable material—

- (a) charred wood.
- (b) netting ; shown by impressions on pottery.
- (c) cord ; shown by impressions on pottery, &c.

V.—Methods of Manufacture of Special Objects ; as—

1. An arrow point of stone ; shown by—
 - (a) block of raw stone.
 - (b) hammer for breaking stone.
 - (c) flakes broken from the stone.
 - (d) arrow point in the rough.
 - (e) piece of antler for fine flaking of the rough arrow point.
 - (f) fine flakes from the rough arrow point.
 - (g) the finished arrow point.
2. An arrow point of antler—
 - (a) tip broken from antler.
 - (b) grinding stone for sharpening the antler.
 - (c) sharpened antler.
 - (d) knife for cutting antler.
 - (e) point of sharpened antler partly cut.
 - (f) point of sharpened antler broken off after being partly cut.
 - (g) drill for making hole in arrow point of antler to receive the arrow shaft.
 - (h) arrow point made of antler, partly drilled to receive arrow shaft.
 - (i) finished arrow point made of antler.
3. Perforated discs made from potsherd.
 - (a) potsherd.
 - (b) potsherd chipped to disc shape.
 - (c) stone for smoothing chipped pottery discs.
 - (d) potsherd chipped to disc shape and rubbed smooth.
 - (e) drill for drilling pottery.
 - (f) smoothed disc of pottery with hole partly drilled through centre.
 - (g) finished disc of potsherd.

And so with various special objects.

VI.—Processes of Manufacture.

1. Drilling—
 - (a) drill.
 - (b) stone disc showing drilling.

- (c) pottery disc showing drilling.
 - (d) shell showing drilling.
 - (e) bone showing drilling.
 - (f) teeth showing drilling.
 - (g) antler showing drilling.
2. Cutting—
- (a) stone showing cutting
 - (b) potsherd showing cutting.
 - (c) pottery showing cutting.
 - (d) shell showing cutting.
 - (e) bones showing cutting.
 - (f) teeth showing cutting.
 - (g) antler showing cutting.
3. Rubbing—
- (a) gritstone used for rubbing.
 - (b) stone shaped by rubbing.
 - (c) pottery shaped by rubbing.
 - (d) shell shaped by rubbing.
 - (e) bone implement sharpened by rubbing.
4. Pecking—
- (a) stone shaped by pecking.
5. Chipping—
- (a) antler point used for chipping.
 - (b) stone showing chipping and flaking.
 - (c) pottery showing chipping.
6. Sewing.

VII.—Materials used.

1. Stone—
- (a) limestone.
 - (b) diorite.
 - (c) quartz pebble.
 - (d) flint or chert.
 - (e) slate.
 - (f) hematite.
 - (g) gritstone.
 - (h) clay (pottery).

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2. Shell—

- (a) shells from the Atlantic coast.
- (b) shells used in making pottery.
- (c) clam shells.

3. Animal tissue—

- (a) deer bone.
- (b) antler.
- (c) teeth of bear.
- (d) teeth of beaver.
- (e) teeth of deer.

4. Vegetable material—

- (a) vegetable fibre shown by network impressions on pottery.
- (b) vegetable fibre shown by cord impressions on pottery.
- (c) charred wood.

VIII.—Æsthetic Sense.

- (a) disc of stone, ornamented.
- (b) human face carved in sandstone.
- (c) animal form represented upon stone by incised lines.
- (d) potsherd showing ornamental handles.
- (e) potsherd showing impression of netting.
- (f) bird-head ornament from rim of pottery dish.
- (g) bone awl with ornamental notches.

IX.—Personal Adornment.

- (a) pendants of shale, or coal.
- (b) stone ornaments.
- (c) shell beads.
- (d) shell ornaments.
- (e) pendant made of shell.
- (f) beads of bird bone.
- (g) pendants made by perforating animal teeth.

X.—Amusements.

- (a) smoking pipe.
- (b) disc of stone, probably used in games.
- (c) discs of pottery, probably used in games.

- (d) fish hooks made of bone.
- (e) bone tube, probably used in games.
- (f) bone cylinders, probably used for gambling.
- (g) toe bone of deer, drilled and cut, probably used in a game similar to "cup and ball."

XI.—Association of Animals with Man; shown by bones of—

- (a) opossum.
- (b) beaver.
- (c) woodchuck.
- (d) raccoon.
- (e) gray fox.
- (f) black bear.
- (g) wolf.
- (h) deer.
- (i) elk.
- (k) blue heron.
- (l) wild turkey.

XII.—Diseases and Injuries.

- (a) diseased bones of face and head.
- (b) wound caused by blow on head.
- (c) knife marks around crown of skull.
- (d) diseased vertebræ (ankylosis of sacrum and vertebræ).
- (e) diseased breast bone.
- (f) diseased upper and lower arm bones.
- (g) diseased finger bones (ankylosis of phalanges).
- (h) diseased hip bone.
- (i) diseased lower leg bones.
- (k) arrow wound in heel.

XIII.—Method of Burial.

1. Shown by photographs—
 - (a) of burial mounds.
 - (b) of skeletons as found in graves.

THE AUSTRALIAN MUSEUM.

By S. SINCLAIR, Secretary to the Trustees.

THE Australian Museum was founded in the year 1836. It was originally connected with the Botanic Gardens, and was located in a room in Macquarie Street. It was soon afterwards removed to the Surveyor-General's office in Bridge Street, where it remained till 1849, in which year it was again removed to its present site at the corner of William Street and College Street. The building at that time consisted of one room with a gallery, which still exists as a portion of the present Museum. In 1869, a plan for a handsome structure to contain the Museum and kindred institutions was prepared, and partly carried out, additions having been made from time to time in accordance with it. The interior now consists of the ground floor, with extensions from the terminal halls at each end, and of an upper floor, which is reached by a broad staircase, with an extension into an adjoining gallery.

The collections are displayed to the best advantage in these halls, and the systematic arrangement is as complete as the unfinished state of the building will permit. The exhibits, which in 1837 numbered about 800, may now be counted by hundreds of thousands, and require for their display far more space than is at the disposal of the Trustees.

The affairs of the Museum continued to be managed by a committee until 1853, when it was incorporated by Act

of Parliament under a Board of Trustees composed of twelve official trustees—one trustee named by the Governor and called the Crown trustee, and eleven elective trustees. The present president of the board is Dr. James C. Cox. Under the Trustees, the curator (now Mr. Robert Etheridge, jun.) has charge of the administration and the control of the staff.

The Museum is open to visitors on week days (Mondays excepted) from 10 a.m. to 5 p.m., and on Sundays from 2 to 5 p.m. On Monday afternoons, the collections are accessible to students and schools, for teaching purposes, on application being made to the curator. The total number of visitors recorded during the last seven years was—

		Week days.	Average per day.	Sundays.	Average per day.
1891,	- - -	91,910	349	40,935	961
1892,	- - -	94,438	357	36,263	712
†1893,	- - -	81,551	311	30,776	581
1894,	- - -	86,246	330	34,324	660
†1895,	- - -	86,353	325	32,226	632
†1896,	- - -	83,351	316	34,494	663
1897,	- - -	89,907	341	32,987	634

† Partially closed for repairs during these years.

The Museum collections are obtained by gift, purchase, exchange with other institutions, and by collection. The most valuable acquisitions recently received are:—A fine collection of mounted sheep, goats, and dogs from the Museum at Florence, in exchange; one of Captain Cook's original MS. journals, or Log of *H.M.S. Endeavour*, which was kept by him in triplicate, presented by F. H. Dangar, Esq.; a collection of "Cook Relics," purchased by the Agent-General, and deposited in the care of the Trustees by the Government of New South Wales; a valuable collection of opalised reptilian remains from White Cliffs,

New South Wales, by purchase ; a fine collection of Marbles of the Bathurst District, New South Wales, prepared by Mr. W. Roberts, and presented by the New South Wales Government ; the well-known "Dobroyde" collection of Australian birds, formed by Messrs. Ramsay, and purchased from them by the Government of New South Wales ; the "Nocoleche" meteorite, a mass of meteoric iron weighing 44 lbs., presented by Mr. George J. Raffel, who discovered it on the Western Plains of New South Wales ; the "Mount Stirling" meteorite, a mass of meteoric iron weighing over 200 lbs., found in Western Australia, and purchased by the Trustees ; collections of coins and medals from the British Government, and of coins from the Imperial German, the Austro-Hungarian, the Hawaiian, the Belgian, the Ceylon, and the Indian Governments.

During the year 1897 there were received in all—by donation, 7,379 ; by exchange, 1,455 ; by purchase, 1,277 ; by collection, 1,888—total, 11,099 specimens.

At the suggestion of the local committee, the Trustees of the Australian Museum appointed one of their officers, Mr. Charles Hedley, to accompany the "Funafuti Coral Reef Boring Expedition," under the command of Professor W. J. Sollas, LL.D., F.R.S. He succeeded in amassing an interesting collection, which is now in process of description by the scientific staff of the Museum, and shortly to be published as one of the Museum "Memoirs." The Trustees have also appointed another of their officers, Mr. Edgar R. Waite, to accompany a Deep-Sea Trawling Expedition which has been fitted out by the Government for experimental fishing off the coasts of New South Wales. A large amount of valuable material and many new specimens are thus being accumulated.

The Museum collections are classified and arranged in

the following main departments, each under the charge of a scientific officer :—

ZOOLOGY—Mammals, Reptiles, and Fishes.

Birds.

Mollusca.

Insects.

Lower Invertebrata.

ANTHROPOLOGY AND ETHNOLOGY.

PALEONTOLOGY.

GEOLOGY AND MINERALOGY.

The library contains about 8,000 volumes, consisting principally of Proceedings of Scientific Societies, and of books required for reference in connection with the work of the Museum. It is intended, in the first place, for the staff of the Museum, but is available, under regulations, for consultation by students. Books are not lent.

The Trustees publish from time to time books and papers relating to the work carried on in the institution. These consist of—the “Annual Report” of the Trustees, which contains summaries of the work done, and gives necessary lists and schedules ; the “Records,” which contain papers by the staff describing specimens and giving reports of scientific expeditions ; “Catalogues” of collections as opportunity offers ; and “Memoirs” on special subjects.

The Museum is supported partly by an endowment provided under the Act of Incorporation, and partly by funds voted annually by Parliament. The total expenditure in 1897 amounted to £6,460. The financial and commercial branches are managed by the Secretary to the Trustees, who is assisted by and controls the clerical staff.

The staff of the Museum is as follows :—

Robert Etheridge, jun.,
Sutherland Sinclair,

Curator (also Palaeontologist).
Secretary and Librarian.

- Edward P. Ramsay, LL.D., Consulting Ornithologist, &c.
F.L.S.,
- Thomas Whitelegge, F.R.M.S., Zoologist (Marine Invertebrata).
- Alfred J. North, C.M.Z.S., Ornithologist and Ethnologist.
- Thomas Cooksey, Ph.D., B.Sc., Geologist and Mineralogist.
- Edgar R. Waite, F.L.S., Zoologist (Mammals, Reptiles,
and Fishes).
- Charles Hedley, F.L.S., Conchologist.
- W. J. Rainbow, Entomologist.
- F. T. Clark, Clerical Assistant.
- Articulators, Taxidermists, Carpenters, Attendants, and
Messengers.

Note.—Since this paper was written, several parts of the "Memoir" on Funafuti have been issued.—ED.

SOME RUSSIAN MUSEUMS.

By F. A. BATHER, M.A., F.G.S., of the British Museum (Nat. Hist.).

DURING the summer of 1897 the Seventh International Geological Congress met in St. Petersburg and visited various parts of the Russian Empire under the gracious auspices of His Imperial Majesty, the Tsar, and the Grand Duke Constantin Constantinovitch. I had the honour of attending this Congress as one of the two delegates from the British Museum, and among my instructions was that I should visit and report on such museums as came in my way. These facts will account for the scattered geographical distribution of the museums visited, and for the fragmentary nature of my notes upon them. The museums visited were those of St. Petersburg, Reval, Jurjev (Dorpat), Moscow, Saratov, Astrakhan, Tiflis, Theodosia. In other towns time did not permit of a visit to the museum. As regards the nature of the following observations, it must be remembered that the occasion of a large and somewhat miscellaneous gathering, such as this Geological Congress, is not altogether a favourable one for special investigations into museum technique. The officials, with the best will in the world (and in Russia their courtesy and attention were pronounced), cannot attend to a thousand inquirers at once, while the time that might have been available is seriously encroached on by receptions, speeches, and public hospitalities, from which a delegate cannot easily escape. I may add that

I confined my attention, and will confine these remarks, almost entirely to the zoological and geological collections. Those who expect an account of the treasures of the Hermitage or of the Historical Museum at Moscow expect too much.

The **Imperial Academy of Sciences at St. Petersburg** possesses collections of great value, ever being added to by the energy of its professors, and increased in importance through their researches. The meetings of the Geological Congress were held in the fine rooms recently built for the reception of the zoological collections, and since the specimens were in process of removal I can give no account of their condition.

The Museum of the Geological Department of the Academy, known as the **Musée Minéralogique**, is the best arranged of the geological museums of St. Petersburg ; and this is due to Dr. Sidney, Baron von Wöhrmann, who recently succeeded Dr. J. V. Rohon as assistant. The principle of arrangement is peculiar. In the wall-cases is exhibited the general collection of fossils, arranged zoologically, while in the table-cases are displayed the numerous collections that have furnished the type-material for various papers, those connected with each paper being kept together. This arrangement is adapted for scientific students rather than for the public. It has certain obvious advantages, so long as one is well acquainted with literature ; and to the museum of a learned society containing specimens described in the publications of the society, it is well adapted, at all events during the earlier years of the life of the society. On the other hand it may be doubted whether such emphasis of the purely historical and accidental aspect of the specimens is superior to a frankly scientific arrangement. Moreover, as years pass and new writers work over the old specimens, the curator

will have to decide which author's paper is to settle the grouping; is he to follow ancient or modern? Compromise will soon result in confusion. In some groups the difficulty has already arisen. Thus many Cystidea, first described by Schmidt and others, have been brought together under the head of "Stammesgeschichte der Pelmatozoen von Dr. Otto Jaekel," although Dr. Jaekel's work is not published even yet.

Baron von Wöhrrmann has most kindly furnished me with the following list of works in which the specimens of the Academy have been described. This answers almost the same purpose as a catalogue of the figured and type-specimens in the Museum:—

1. Revision der ost-baltischen silurischen Trilobiten.
 - I. Phacopiden, Cheiruriden und Encrinuriden ; by Fr. SCHMIDT. *Mem. Acad. Imp. Sci. St. Petersburg*, ser. 7, vol. xxx., No. 1. 1881.
 - II. Acidaspiden und Lichiden ; by Fr. SCHMIDT. *Ser. cit.*, vol. xxxiii., No. 1. 1885.
 - III. Illaeniden ; by Gerhard HOLM. *Ser. cit.*, vol. xxxii., No. 8. 1886.
 - IV. Calymmeniden, Proëtiden, Bronteiden, Harpediden, Trinucleiden, Remopleuriden und Agnostiden ; by Fr. SCHMIDT. *Ser. cit.*, vol. xlii., No. 5. 1894.
 - V. Asaphiden, Lief. 1.; by Fr. SCHMIDT. *Op. cit.*, Phys. Math. Cl., ser 8, vol. vi., No. 11. 1898.
2. Ueber die russischen silurischen Leperditien mit Hinzuziehung einiger Arten aus den Nachbarländern ; by Fr. SCHMIDT. *Op. cit.*, ser. 7, vol. xxi., No. 2. 1873.
3. Nachtrag zur Monographie der russischen silurischen Leperditien ; by Fr. SCHMIDT. *Ser. cit.*, vol. xxxi., No. 5. 1883.
4. Die Crustaceenfauna der Eurypterenschichten von Rootziküll auf Oesel ; by Fr. SCHMIDT. *Loc. cit.* 1883.

5. Ueber die Organisation des Eurypterus Fischeri; by Gerhard HOLM. *Mem. Acad. Imp. Sci. St. Petersburg, Phys. Math. Cl.*, ser. 8, vol. viii., No. 2. 1898.
6. Die neuentdeckte Unter-cambrische Fauna in Estland; by Fr. SCHMIDT. *Ser. cit.*, vol. xxxvi., No. 2. 1888.
7. Die cambrische Fauna von der Lena und dem Olenek; by Baron Eduard TOLL. MS.
8. Die paläozoischen Versteinerungen der Neusibirischen Insel Kotelny; by Baron Eduard TOLL. *Ser. cit.*, vol. xxxvii., No. 3. 1889.
9. Silurian Corals from the Middle Tunguska; determined by G. LINDSTRÖM. MS.
10. Silurian Corals from Olenek; collected by Tschekanowsky and determined by G. LINDSTRÖM. MS.
11. Materialien zur Kenntniss der Fauna der devonischen Ablagerungen Sibiriens; by Alexander STUCKENBERG.
12. Schrenks Reise durch die Tundren der Samojeden. Bd. II. Kohlenkalk und Perm von der Pinega; by Graf KEYSERLING.
13. Ueber einige arctische Trias-Ammoniten des nördlichen Sibiriens; by Dr. Edmund Mojsisovics von MOJSVAR. *Mem. Acad. Imp. Sci. St. Petersburg*, ser. 7, vol. xxxvi., No. 5. 1888.
14. Arctische Trias-Faunen; by Dr. E. MOJSISOVICS von MOJSVAR, TELLER, and BITTNER. *Ser. cit.*, vol. xxxiii., No. 6. 1886.
15. Ueber die Brachiopoden-Gattung Obolus, Eichwald; by August MICKVITZ. *Op. cit.*, Phys. Math. Cl., ser. 8, vol. iv., No. 2. 1896.
16. Lias von Anabar, Oxford von Anabar, Neocom von Anabar; by MICHALSKY. MS.
17. Die Inoceramen-Schichten an dem Olenek und an der Lena; by J. LAHUSEN. *Mem. Acad. Imp. Sci. St. Petersburg*, ser. 7, vol. xxxiii., No. 7. 1886.
18. Wissenschaftliche Resultate der zur Aufsuchung eines angekündigten Mamuthkadavers von der kaiserlichen

- Akademie der Wissenschaften an den unteren Jenissei ausgesandten Expedition ; by Fr. SCHMIDT. *Ser. cit.*, vol. xviii., No. 1. 1872.
19. Ueber die Petrefakten der Kreideformation von der Insel Sachalin ; by Fr. SCHMIDT. *Ser. cit.*, vol. xix., No. 3. 1873.
20. Zur Kenntniss der Tremataspiden ; by J. V. ROHON. *Méth. géol. et. paléont.*, vol. i., livr. 2. 1894.
21. Ueber Cephalaspis (Thyestes) Schrenki, Pander aus dem Obersilur von Rootzikiüll auf Oesel ; by Fr. SCHMIDT. *Loc. cit.* 1894.
22. Die obersilurischen Fische von Oesel. I. Thyestidae und Tremataspidae ; by J. V. ROHON. *Mem. Acad. Imp. Sci. St. Petersburg*, ser. 7, vol. xxxviii. No. 13. II. Selachii, Dipnoi, Ganoidei ; by J. V. ROHON. *Ser. cit.*, vol. xli., No. 5. 1893.
23. Ueber fossile Fische vom Oberen Jenissei ; by J. V. ROHON. *Ser. cit.*, vol. xxxvi., No. 3. 1889.
24. Stammesgeschichte der Pelmatozoen ; by O. JAEKEL. MS.
25. Ueber einige neue und wenig bekannte baltisch-silurische Petrefacten ; by Fr. SCHMIDT. *Mem. Acad. Imp. Sci. St. Petersburg*, ser. 7, vol. xxi., No. 11. 1874.
26. Fossile Insecten aus der Juraformation Ost-Sibiriens ; by BRAUER, REDTENBACHER, GANGLBAUER. *Ser. cit.*, vol. xxxvi., No. 15. 1889.
27. Die Jura-Fische von Ust-Balei in Ost-Sibirien ; by J. V. ROHON. *Ser. cit.*, vol. xxxviii., No. 1. 1890.
28. Beiträge zur Jura-Flora Ost-Sibiriens und der Amurlandes ; by O. HEER. *Ser. cit.*, vol. xxii., No. 12. 1876.
29. Beiträge zur fossilen Flora Sibiriens und der Amurlandes ; by O. HEER. *Ser. cit.*, vol. xxv., No. 6. 1878.
30. Nachträge zur Jura-Flora Sibiriens ; by O. HEER. *Ser. cit.*, vol. xxvii., No. 10. 1880.

31. *Beiträge zur Jura-Flora Russlands.* III. *Jura-Flora der unteren Tunguska*; by Johannes SCHMALHAUSEN. *Ser. cit.*, vol. xxvii., No. 4. 1879.
32. *Miocene Flora der Insel Sachalin*; by O. HEER. *Ser. cit.*, vol. xxv., No. 7. 1878.

There is very little room at the Academy for the valuable collections, and only a sum of 500 roubles (about £70) per annum for the purchase of specimens and for their exhibition. One can hardly expect to learn much in the way of museum technique. I may, however, mention the small trays of a pattern which Dr. von Wöhrmann has introduced from Munich. These are of pasteboard covered with white glazed paper, and are made in multiple sizes. The special point about the arrangement is the placing of a thick card on the bottom of each tray, and underneath this are preserved all old labels or any short notes relative to the specimen, such as would otherwise be liable to be blown about. The card can be changed if it gets dirty, and this is cheaper than throwing away the whole tray. The trays, which are both good and cheap, are made by C. F. Dreispring, Lahr, Baden. This method has, I am told, been adopted in the Manchester Museum.

One of the most noteworthy objects in the mineralogical collection of the Academy is a meteorite that was found in 1749 by the celebrated traveller Pallas, in the Jenissei Province, on a hill between the rivers Ubei and Ssissim. It was not sent to St. Petersburg till 1777, when it weighed 42 pud (688 kilogr.). In 1867 it was cut in half at the Imperial Lapidary works at Peterhof, and in 1871 it weighed 31 pud, 16½ pounds (514·557 kilogr.).

The University of St. Petersburg, in its buildings on Vassili Ostrov facing the Neva, contains a **Musée Minéralogique** and a **Musée Géologique**. A guide giving a

detailed description of these was published by the University for the meeting of the Congress.

The Mineralogical Museum is on the first floor, in rooms that are well lighted from the east, south, and west. These rooms comprise a chemical laboratory for five to ten students, with a smaller room adjoining for volumetric analysis; a chemical laboratory for the curators, affording space for two or three workers; a small lobby with a few shelves; a vestibule in which are two cupboards containing a collection of the subsoils, loess, and alluvial deposits of Russia; a room for the preparation of fresh accessions and general curatorial work; a study for the professor; the main exhibition-room, about $10\cdot5 \times 8$ metres, containing twenty-one glass cases with drawers underneath; a lecture-room capable of holding 150 auditors, with six glass cases and seventeen cupboards around its walls; the library and instrument-room. The cases in the exhibition-room are of two types: the ordinary table-case with slightly sloping glazed top, and with tiers of six drawers below; higher cases against the walls, with glazed tops sloping at a steeper angle, the specimens on step-like shelves, and with cupboards beneath. These all contain the main collection, which is a very fine one, brought together by the exertions of previous and present professors, such as Pander, Meder, Sokolov, A. P. Postels, E. C. Hoffmann, P. A. Pusirefsky, E. P. Wreden, M. B. Jerofeyev, A. A. Inostranzev, and B. B. Dokutchaev. Among collections made by others and acquired by donation may be mentioned 600 Siberian minerals from Chief Engineer of Mines, Mr. Mor; 500 Hungarian specimens from Mr. Zipser of Neusol; 246 minerals and rocks from the region of Zmeinogorsk, the gift of Mr. Mordvinov; Russian minerals from the Archbishop Nil of Jaroslav; 500 minerals presented by the advocate, I. B. Novikov; 1550 minerals from the Imperial

Lapidary works ; one of the six virgin emeralds found at Ekaterineburg, presented by the Tsar ; other rare and valuable stones from Messrs. Perovsky, Kojoukhov, and Belov. Among collections acquired by purchase may be mentioned those of the mining engineer, C. Romanovsky, of Professor E. C. Hoffman from the Oural, and of Professor Jeroseyev. In the lecture-room are contained the specimens used in demonstration and the crystallographic models. In 1894, being the seventy-fifth anniversary of the University, the total collection, including specimens for examination and study, consisted of 10,995 specimens, valued at 25,000 roubles (about £3,900).

During the visit of the Congress the central space of the lecture-room was occupied by a collection of 800 examples of Russian soils made by Professor Dokutchaev and his pupils ; these were accompanied by sections of soil and subsoil, and by maps and diagrams, showing the distribution of the soils. The collection was composed exclusively of specimens of soil naturally formed on solid ground, such as that of steppes, prairies, and forests, at the expense of the subsoil, by the action of air, plants, and animals. Such a collection enables one to demonstrate the variation of the soil in direct accordance with the underlying rock, and brings out the laws that govern the geographical distribution of soils. The importance of this study to an agricultural population is incontestable. It is a branch of applied geology that takes economic rank with questions of mining or of water-supply ; and local museums in agricultural districts might well endeavour, by suitable exhibits, to encourage this line of research.

The Geological Museum is on the second floor, in rooms lighted from either east or west according to their position. These rooms comprise three or four lobbies, a laboratory for the chemical and mechanical analysis of rocks and ores,

capable of accommodating five workers at once ; a dark chamber ; a sorting-room ; a study for the professor ; a library ; a lecture-room, and four exhibition-rooms. The collections are divided into petrographical and palæontological.

The Petrographical Collections are chiefly exhibited in a room measuring $10 \times 7\frac{1}{2}$ metres, also in the sorting-room and the lecture-hall. The principal collections are in the main exhibition-room, and consist exclusively of the rocks of Russia in Europe and Russia in Asia, and of part of Central Asia, the inclusion of the latter being no doubt prophetic. There are 13,145 rock-specimens, and about 1200 thin sections. The wall-cases are high, with the lower third formed of shallow drawers, the middle third of step-shelves sloping back under glass flaps, and the top third of very narrow shelves placed vertically above one another, under glass doors. The specimens rest immediately on the shelves, and each is surmounted by its label ; no specimen is in any way obscured by another. The table-cases have drawers below, and three shelves above, covered by sloping glass flaps. In addition to examples of sedimentary, igneous, and metamorphic rocks, there are exhibited illustrations of dynamo-metamorphism, pyro-metamorphism, and contact-metamorphism ; wind-worn and glaciated rocks ; erratics ; concretions ; and so forth. The subsidiary collections are arranged geographically, as originally brought together by various geologists. Among the many whose writings have been based upon specimens in this Museum may be mentioned A. Inosfrantzev, F. Loewinson-Lessing, C. C. von Vogdt, P. N. Venukov, and N. Karakasch.

The Palæontological Collections occupy three rooms. In the first, which is 10×8 metres, are the Palæozoic and Mesozoic fossils. These are arranged primarily according

to the geological systems : Silurian (*sensu lato*), Devonian, Carboniferous, Permian, Trias, Jura, Cretaceous. The fossils of each system are placed in zoological order. In the second room, nearly 8×8 metres, are the Cainozoic fossils. These are primarily divided into Palæogene and Neogene, and then arranged according to geographical regions, for it is found that the faunas of those regions are particularly distinct. The third room, 11×5.5 metres, contains relics of the Quaternary period from various parts of Russia. The fossils are exhibited in low table-cases, the tops of which have a sloping portion covered by glazed flaps, and surmounted by a low vertical portion. Both table-cases and wall-cases have drawers underneath. Only Russian fossils are exhibited under the glass.

The richness of the collections is largely due to the purchase, for 6,000 roubles, of the great collection that served K. E. v. Eichwald as material for his "Lethaea Rossica." The Museum also contains the collections of Tertiary fossils bought of Prof. R. Rogovitch ; a collection of 1,400 named species made and presented by Prof. E. J. Hoffmann, formerly curator ; the collection of B. A. Kiprianow from the Cretaceous phosphorites of Koursk ; Cretaceous and Jurassic fossils from the provinces of Riazan and Moscow, collected by A. Wénetsky, who was curator from 1867 to 1869. The total number of specimens, excluding works of pre-historic man, is 54,378, representing 8715 species.

The so-called Silurian fossils include numerous type-specimens of Eichwald, Kutorga, Hoffmann, F. Schmidt, G. Holm, and Rohon. The Devonian fossils comprise type-specimens of Eichwald, Venukov, E. Solomko (Stromatoporoidea), Loewinson - Lessing (Cephalopoda), and Rohon (Pisces). The Carboniferous fossils include type-specimens of Eichwald, Venukov, Tzwetatev, and

Karpinsky (Cephalopoda), and Inostrantzev (*Dactyloceras*). Among the Permian fossils are type-specimens of Eichwald and Amalitzky. The Jurassic fossils include Anthozoa, described by Eichwald and Solomko; Brachiopoda, described by Eichwald, Hoffmann, and Semenov; Lamellibranchia and Gastropoda, described by the same authors and by Lahusen; Cephalopoda, described by Semenov, Eichwald, Hoffmann, Stuckenbergs, Andrussov, Karakasch, Kondratiev, and Solomko. The Tertiary collections comprise type-specimens of Eichwald, d'Archiac, Andrussov, and others. The Quaternary series is chiefly remarkable for the collection of human remains and other relics of the Stone Age from Lake Ladoga, brought together and described by Inostrantzev in 1882. There is also a very large collection of recent Mollusca, the bequest of Mr. Boutourline.

This Museum, it will be seen, contains very valuable material for the study of Russian geology. But the methods of exhibition are neither specially well suited for teaching purposes, nor of any interest to the professional curator.

The **Museum of the Geological Committee, St. Petersburg**, is not large. It occupies five rooms which, though well built, are very badly lighted. The specimens are arranged in solid oak cases, magnificent but ill adapted for display. The labels are in Russian. The arrangement appears to be stratigraphical, and presents no features of special interest. I regret that this account is so meagre. I had hoped to obtain some information and to see certain type-specimens; but Dr. S. Nikitin, the director, though he most kindly made two appointments with me, was prevented by the work of the Congress from keeping either of them.

The **Estland Provincial Museum at Reval** began with

the founding of the Estland Literary Society in 1842, and in 1864 moved into its present quarters in the newly-built house of the St. Canutigilde. A Society, with members of both sexes, was then formed for the continuance of the Museum, and aroused an interest in it by better methods of exhibition and by public lectures. Contributions flowed in, the most important of which was the rich collection begun in 1802 by Dr. Johann Burchard-Bellawary, and made over to the Museum by his heirs. The Museum is not well housed, as we regard such things nowadays, and the general appearance of the objects is not very inviting. But as to the value of the collections, especially those relating to Estland, there can be no doubt. The following may be mentioned—Antiquities of the Baltic Provinces ; costumes, objects of domestic use, and portraits of modern Estonians ; a collection of coins, specially rich in those from the Baltic Provinces, and including Anglo-Saxon, Danish, Swedish, Old German, and Arabian coins found in the neighbourhood ; a collection of medals and impressions of seals; works of Estonian painters, sculptors, engravers, and the like ; ethnographic collections from Asia and America made by the Estonian travellers, A. J. von Krusenstiern, Otto von Kotzebue, F. von Wrangell, and others. A catalogue of most of the above objects, excluding the coins, with a list of the collection of autographs, was compiled by Gotthard von Hansen, and published at Reval in 1875 (8vo, pp. vi. + 124, with xi lithographic plates).

Among objects of natural history we note a collection of native insects, chiefly Lepidoptera and Coleoptera ; also a herbarium containing nearly all the species of phanerogams, and most of the cryptogams found in the Baltic Provinces.

Finally, and of chief importance, is the rich collection of Lower Palæozoic fossils, known by report to every

palæontologist. There is no country in the world where the rocks from the base of the Cambrian to the top of the Silurian are seen in more uninterrupted sequence, or where they are richer in well-preserved organic remains. The collection was accumulated partly in response to a circular sent by the Museum Committee to the landed proprietors of Estland, partly by the active research of Mr. Stacy, formerly United States Consul in Reval, but chiefly by the unwearied energy of Akademiker Friedrich von Schmidt, whose life-work has been the elucidation of the Estland Palæozoic faunas. These fossils have a room to themselves and are arranged, first of all stratigraphically, and then according to localities, so that one can see the distribution at a glance. The arrangement is admirably adapted to the travelling geologist.

The collections of the ancient **University of Dorpat**, now to be called Jurjev, are chiefly in a museum in the town, but a few are in the University buildings around the ruins of the old cathedral on the hill. Among the latter the members of the geological excursion were shown a large collection of skulls from the ancient burial-grounds of the cathedral, as well as the anatomical collections. In the zoological department is a fine mammoth's skull. Here Professor Rosenberg had displayed for us his rich collection of Quaternary Mammalian remains, some from the neighbourhood of Dorpat, others from more distant parts of Russia. In the anatomical lecture-room is a good bronze model of the muscles of a human torso, designed by H. Virchow and others. Before descending to the town we admired the striking monument by Opékuchine—the bronze statue of the great biologist K. E. von Baer—which occupies a charming position at the end of an avenue, with a background of firs.

The Geological Collections, which are in the Museum,

contain the large armoured fish from the Devonian of the immediate neighbourhood, described by Professors Pander and Assmuss. Here also are the originals of Rosen's "Ueber die Natur der Stromatoporen," *Verh. russ. Min. Ges.*, 1867; of Dybowsky's "Die Chætetiden der Ostbaltischen Silurformation"; of Grewingk's "Geologie und Archæologie des Mergellagers von Kunda in Estland," 1822. Here I was able to examine the types of Volborth's *Achradiocystis* and of Pacht's *Dimerocrinus oligoptilus*; but here, as in the other museums, most of the Cystidea, which I had specially intended to study, were temporarily away with Dr. O. Jaekel, of Berlin. The geological collections were in process of arrangement by Professor Andrußow, who had only been at Dorpat for one year. The Zoological Collection contains two good specimens of *Bos urus* from Bialowitza. In the Mineralogical Collection is a good series of 170 meteorites, a catalogue of which, by Professor F. Loewinson-Lessing, has been published in *Acta Imp. Univ. Iurievensis*, vol. v., No. 2 (1897). There is as yet no attempt at modern methods of exposition in this Museum.

The Botanical Collections of the University are in a small museum attached to the Botanical Garden. This garden, under the direction of Professor Kusnezow, contains a remarkable assemblage of trees and plants from various parts of the northern hemisphere, especially from the distant regions of the Russian Empire. The "alpinetum" is particularly successful. The climate of Dorpat is mild, and the sheltered position of the garden adapts it for acclimatisation. The chief trouble is in the spring, when the sun is very hot but the soil still frozen.

There are also to be seen in Dorpat the collections of the **Learned Society of Estonia**, chiefly archæological, and comprising many excellent pre-historic specimens.

Moscow is rich in museums, but the short time which the affairs of the Congress left at our disposal did not permit me to make an exhaustive study of them.

The Geological Museum of Moscow University was the best arranged museum that I saw in Russia. It occupies two rooms, one lit from the side, the other from the side and one end. The first room contains the collection of Russian fossils, made by professors and students at the University. These are displayed in eight table-cases, the arrangement being primarily stratigraphic, then topographical, and lastly biological. Among the many interesting specimens one notices a fine collection of Palæogene plants from Saratov on the Volga, recently obtained by Professor Pavlov. The foreign fossils are in four table-cases, and have a similar arrangement. A totally distinct set of fossils constitutes the Palæontological Collection, and is arranged in zoological order in wall-cases on two sides of the room, two half table-cases, and six smaller table-cases. This is especially rich in mammalian remains, many of which are the specimens figured and described by Mdme. Marie Pavlov, or plaster casts of them.

The second room is chiefly devoted to dynamical geology. Photographs and specimens illustrate the action of wind, water, volcanoes, earth movements, coral-reef formation, and the like. In this room is a small case in which Ammonites and Lamellibranchs of the Volgian beds are placed beside the allied forms from the Jurassic rocks of France and England, for purposes of direct comparison.

Although the special collections occasionally destroy the symmetry and the primary educational effect of the whole, still there is scarcely an exhibit in this small Museum but shows signs of independent thought in its preparation, and consequently is calculated to evoke thought in the student. It is further to be noticed that in this relatively little

collection there are exemplified no less than five methods of dealing with fossils—five aspects of the science.

Moscow University also possesses Museums of Mineralogy, Botany, Zoology, Human Anatomy, Anthropology, and Fine Arts. Of these the most important is the Zoological Museum, founded in 1812 by G. Fischer de Waldheim. Unfortunately it was the middle of the vacation when we visited Moscow, so that these collections were not accessible.

The great **Historical Museum** of **Moscow**, with its rich archæological collections arranged for the most part in chronological order, is well known.

The **Romantzeff Museum**, founded at St. Petersburg in 1828 by Count Romantzeff (Rumiantsev), was transferred to **Moscow** in 1861, where it was housed in the Dom Pachkova. It contains extensive ethnographic and archæological collections, a large library with manuscripts and ancient Slavonic books, and a picture gallery. The affairs of the Congress and other official business prevented me from taking more than a cursory glance at these museums, so that I shall venture no remarks upon them.

The **Radichtchev Museum** at **Saratov** on the Volga is a public museum, belonging to the town and under the direction of the Zemstvo; in other words, a municipal museum. It was the first of its kind in Russia; others are at Ekaterineburg, Novotscherkask, Poltawa, and the Romantzeff at Moscow. We were entertained by the municipality at the Saratov Museum, and Mr. V. Roupini, the director, was kind enough to give me some information. This Museum was founded in 1885, and has an annual grant of 3,000 roubles (£475) for all expenses. With it, however, is associated a School of Design, and the total grant amounts to 9,000 roubles (£1,425). Six people, including the director of the Museum and the master of the School of Design, are employed in the superior posts,

so that no money is left for the purchase of specimens. Saratov, it may be mentioned, is a large town, with a few factories, and trade in grain, tobacco, salt, wood, and fish. The object of the Museum, therefore, is to be of service for the industrial arts ; but so far the object is hardly attained. The bulk of the collection is in the Fine Arts, and contains some really good pictures, engravings, and woodcuts ; there is no special school represented, nor any selection to illustrate various schools. There are also a few examples of old carved furniture, various Eastern and other curios, a poor entomological collection, a good series of Siberian minerals, a collection of coins and of medals. It is not proposed to extend the Natural History or Ethnographic Collections ; but the Museum is very much at the mercy of donors. The objects of chief interest to the casual visitor are a death mask and various relics of Turgeneff. The Museum is open daily from 10 to 3. Admission, 15 kopeks (about 6d.) ; free on Sundays.

Musée de la Société des Explorateurs d'Astrakhan.—This Society was founded by Peter the Great ; the Museum was started about eleven years ago. The subscriptions to the Society amount to 800 roubles per annum, and the municipality gives to the Museum 2,000 roubles per annum. The total income is therefore about £440. The Museum occupies six small rooms on the first floor of a private house. It is open free from 11 a.m. to 2 p.m. every day except Monday. Although there is some intention of starting a general educational exhibition series, at present the whole collection is confined to objects from the Province of Astrakhan.

The natural history branch contains a complete collection of the birds of the province, including birds of passage ; these are all in skins. The collection of mammals does not appear to be complete ; it includes a young seal

from the Caspian, and a melanic individual variation of the ordinary grey wolf from the mouth of the Volga. The herbarium is not in very good condition. There is a collection of the woods of Astrakhan, which naturally are not numerous; also a collection of various seeds of economic value. There is a complete collection of salts from Lake Baskountchak and from Tchaptchaptchi; but the rest of the geological collection is somewhat miscellaneous.

The Economic side of the Museum is well attended to. It includes a complete collection illustrating the Volgian and Caspian fisheries, and all connected therewith; also models of boats, salting houses, nets, and other appliances. The only omission is of the fish themselves; but it is one that can easily be remedied. Here may be mentioned a series of jars of various kinds of seal oil, together with a model of the apparatus and buildings used for its extraction and refinement. Next in importance is a set of agricultural implements and models, including windmills for irrigation. Here also was a model of an irrigating water-wheel, which had been invented by a native of Astrakhan, but had not come into general use. I mention it because the inventor happens to have hit on the same type of wheel with oblique tubes as is used for irrigating the rice-fields of Japan. There are a few exhibits connected with the silkworm industry; but, as it was found impossible to grow mulberry trees in Astrakhan, this has died out. An exceptionally interesting collection is that of clothes, household implements, and religious objects of the Kalmucks, plenty of whom are to be seen in the neighbourhood. Among these objects one notices a rude wooden still, used for obtaining a spirit from fresh milk.

The Archæological department contains various antiquities from the neighbourhood, among them objects from the ruins of an ancient Tartar capital—Selitrani, including

tiles, pottery, and earthenware pipes used as water-conduits. There is a collection of Russian and of Tartar coins, many of the latter being very rare. The numerous old burial places in the neighbourhood, some already being eaten into by the Volga, have furnished a fine series of skulls of various races, and would probably furnish more if desired.

Mr. Constantin Petroff, who was so obliging as to give me much information, was preparing a catalogue of the Museum in Russian, and hoped that it would be printed during 1898.

The **Caucasian Museum, Tiflis**, originated as the Museum of the Caucasian branch of the Imperial Geographical Society in 1852, on a proposal of Count Vladimir Alexandrovitsch Sollogub. A house was obtained and a beginning made with natural history collections bought, for 325 roubles, of an Austrian resident in Tiflis, Friedrich Bayern, who, in the following year, was appointed curator under the direction of a committee of the Society. This was a somewhat unfortunate start, for Bayern appears to have been a keen enthusiast, with a gift of seeing marvels everywhere, and with a high idea of the value of his collection, but without the scientific training needed to distinguish the relative importance of natural objects. For him a clay gall in the limestone was a fossil alga ; a worn or broken shell became a new species. He was an estimable person whose earnestness impressed people who knew less of natural history than he did ; just one of those cranks that the professional scientific man finds so hard to deal with. When these, and subsequent collections of Bayern belonging to the Agricultural and Archæological Societies, were taken over by the Government, it is not surprising that there arose painful controversies, to which even Bayern's death did not put a stop, and which are here alluded to because they found an echo in English writings of wide circulation.

The growth of the Museum was at first almost entirely in the direction of ethnography, for the study of which a special section of the Geographical Society was formed, with Count Sollogub as president, succeeded by J. A. Bartholomaei, and Mr. Tokareff as secretary, succeeded by A. Berge. The public was first admitted to the Museum in May, 1856, and then only between the hours of twelve and two on Sundays. This step, however, did not increase the interest felt in the Museum, which received very few accessions, and the committee of direction was dissolved in May, 1861.

In 1864 Dr. G. Radde was appointed by the Government to make a biologico-geographical investigation of the Caucasus, and the material collected by him soon reached such proportions as to render it necessary to find some place where it could be safely housed and rendered available for study by specialists. Thus arose the idea of a Government Museum for the study and exhibition of all the products of the Caucasus, and this was finally determined on, and a money grant made for the purpose, in June, 1865. Rooms were hired in the Zovjanov House in Sergeijev Street, the old collections of the Geographical Society were taken over, and on the 2 (14) January, 1867, the Caucasian Museum was first officially opened to the public.

But even before this step was taken, the question of larger permanent buildings became a pressing one. At first the notion seems to have been to erect a sort of Crystal Palace. But, fortunately, a piece of ground facing the Nicolai Street, and opposite the Palace, was bought by the Government. Here, on the firm foundations of some previous buildings, were erected the new Public Library at one end and the Museum at the other, the two being joined by a colonnade and placed under one manage-

ment. It was the wise intention of Dr. Radde to use the intervening plot of ground for a zoological garden in connection with the Museum, at the same time permitting room for the future extension of library and museum buildings. Unfortunately, after some progress had been made in this direction, the ground was taken over by the Government for the site of a girls' school, and the connecting arcade was broken down.

The new museum building was completed in a year, and in October, 1870, was opened to the public. The rapid increase of the collections, chiefly owing to the expeditions of Dr. Radde, followed in 1879 by the transference to the Museum of the collections of the Archæological Society and of the Office of Mines, rendered further extension necessary. This was effected by adding another storey to the building, which previously had been all on the ground floor. This was accomplished and the collections re-arranged in time for the Fifth Archæological Congress, which met at Tiflis in 1881, and led to further archæological investigations and the addition of much material to the Museum. In 1883 the Museum and Public Library were placed under the Minister of Public Instruction, to whom the director was made, and still is, immediately responsible.

The Museum is now a long three-storied building, of which the two lower floors are devoted to exhibition purposes, and are lit from the east and west sides. The walls of the large staircase leading to the first floor are adorned by frescoes *a tempera*, illustrating the mythical history of the Caucasus, and painted by Franz Simm. A small courtyard below street-level contains evergreen shrubs and trees, cages with Caucasian birds, and a few bits of antique sculpture. It is a meagre sample of the charming garden that might have been.

The Museum is open to the public on Tuesday, Friday,

and Sunday, from 10 to 3 o'clock, on payment of 20 kopeks (about 8d.) each person. Children under seven are not admitted. Scholars accompanied by a teacher are admitted free. The admission money produces about 1,200 roubles per annum. In addition to this, the Museum receives a grant of 1,000 roubles for scientific purposes, purchases, and exhibition cases ; and 4,480 roubles for maintenance of the building, heat, lighting, attendants, and so forth. This makes a total income of about £1,150, but does not appear to include the salaries of the director and his staff.

The Museum is entirely confined to the illustration and elucidation of the Caucasus, only such specimens from other regions being admitted as are of direct service for that purpose by comparison or otherwise.

The departments of the Museum are five—Zoological, Botanical, Geological, Ethnographical, and Archæological.

The Zoological Collections have for the most part been obtained by Dr. Radde himself on his numerous expeditions. The data of locality, season, environment, and so forth are therefore authenticated. Other specimens, however, have been obtained by donation, purchase, or exchange. The members of the Imperial family, governors, and other high Caucasian officials have been great benefactors. Other collections have been made by Mr. Koenig, the zoological curator, either in company with Dr. Radde, or on independent expeditions. This activity in collecting is a natural continuation of Dr. Radde's primary appointment to make a biological survey ; the Museum is only an adjunct to that. Connected with this, too, is constant scientific investigation and the frequent publication of results, either in periodicals, monographs, or accounts of travels. This is work which could not be carried out satisfactorily by the staff of the Museum, but the director has been more than usually successful in enlisting the co-operation of a

large number of specialists in various parts of the world. There can be no fear that the collections of the Museum suffer by this devotion to the advance of pure science. On the contrary, more people become interested, the staff of the Museum labours with greater enthusiasm, and the collections acquire a historic value independent of mere numbers or intrinsic worth. In 1896 the Museum contained 6244 specimens of Caucasian Vertebrata, believed to be an almost complete representation of that portion of the fauna. The mammals have been studied by Mr. Satunin, the birds by Dr. Radde, the fish by Mr. Kawraisky, secretary to the Tiflis branch of the Imperial Ichthyological Society; the reptiles and amphibians have been determined by the staff, with assistance from the British Museum. Mr. Koenig is primarily an entomologist, and that branch of the collection is now very rich and well worked up; a collection of 1250 determined species of Caucasian Lepidoptera is the gift of the Grand Duke Nicolai Michailowitsch; there are over 3000 species of Caucasian Coleoptera; over 360 species of Hemiptera.

The exhibited zoological specimens are systematically arranged; but many of the larger vertebrates are "decorativ aufgestellt." Thus, 205 birds, duplicates of common species, are placed about on the tops of wall-cases and in niches; three large glass cases hold 46 specimens of gallinaceous birds, chiefly Caucasian, and some Russian; the Transcaspian fauna occupies another large case, grouped appropriately on rocks and on sandy desert, with pictorial background; the larger mammals are placed along the walls; while the Caucasian Alpine animals form a pictorial group in the middle of one side of the main hall, with scenic background. Scientific purists have, as was to be expected, criticised this so-called decorative arrangement. But Dr. Radde defends himself on the ground of attractiveness for the public, and

consequent encouragement of the higher objects of the Museum. "It is for the public and not for the learned that the Museum exists"; this of course refers to the exhibition series. The scientific student can always have access to the specimens. Moreover, they take up less room than if placed side by side on blocks of wood. This reply has weight so long as the exhibits really are beautiful and attractive on the one hand, and, on the other, instructive, or at least not opposed to the facts of nature: such cases, for instance, as we admire in the National Museum at Washington. But when a group of Alpine animals consists of three Caucasian wild goats, three Caucasian chamois in full winter coat, with a goat and a chamois from Switzerland, and when "the space for this beautiful group is too contracted," it is possible that the unsophisticated Georgian mountaineer might ask how they all happened on the same peak, and how they stayed there without fighting. But it is unnecessary for me to repeat before this Association criticisms that I have already made when discussing the similar exhibits at Melbourne.* After all, one must not overlook the fact that such show-cases are attractive, whether in a museum or a popular exhibition, and that museum curators in the more remote corners of the earth have to gain popular support without having the best means available.

In this part of the collection one notices a fine specimen of an old Caucasian aurochs (*Bos urus*), obtained in 1868. The label says that only 100 of these are now living.

A method of discriminating between indigenous and exotic specimens is by the use of colour—red for Caucasian, yellow for Transcaspian, and blue for the rest. As applied to spirit specimens, this is in the form of a circle painted on

* "Some Colonial Museums," *Rep. Mus. Assoc. for 1894*, p. 223, May, 1895.

the glass ; on dry specimens the label is tied with a cord of corresponding colour.

An important portion of the collection of invertebrates is a case of insect pests, a subject on which Mr. Koenig is often consulted. Mention should also be made of the collection of fish ; a monograph of the Salmonidae is in course of publication. The rest of this collection in 1894 included 165 species represented by 960 specimens.

The Botanical Collection is remarkably complete, and has been largely made by Dr. Radde himself when conducting the studies for his work, "Die Vegetation der Kaukasusländer, pflanzenphysiognomische und phytogeographische Studien," which constitutes part of the great work, "Die Vegetation der Erde," edited by Professors Engler and Drude. The Herbarium also includes important collections by Hohenacker, Smirnov, Dörfller, and others. Much aid is obtained from Dr. Medvedjev, to whose energy is due the truly charming Botanic Garden of Tiflis.

In working out the botanical collections the same methods have been applied as in the case of the zoological.

The Geological Collection differs from the two preceding in that none of it has been collected specially for the Museum according to a definite plan. Only on three of his expeditions has Dr. Radde been accompanied by a professional geologist : in 1870 to Talysch, and in 1871 to Ararat, by Dr. G. Sievers ; and in 1890 to Karabagh by Dr. Valentin. The material, therefore, has not the high value attaching to the Zoological and Botanical Collections ; nevertheless it is very representative of the various formations of the Caucasus. Among the collections may be mentioned donations by successive chiefs of the Office of Mines, accompanied by maps and published accounts ; the collection of Bayern, chiefly of value for the exactness of the localities given, and worked over by Arzruni, Valentin,

and Lebedev; fossils from Daghestan, collected by Abich and transferred from the Geographical Society (Dr. Abich himself has never contributed directly to the work or the collections of the Museum); collections that have afforded material for the writings of Arzruni, Valentin, Simonovitsch, and others. The preceding are all local, but there are also collections serviceable for comparison, especially those from the Crimea, Bessarabia, and Transcaspian; also from various horizons and localities in Western Europe, for the most part the gift of Mr. J. de Morgan in 1892. An account of these collections, "Uebersicht der geologischen Sammlungen des Kaukasischen Museum von N. Lebedew. Deutsche Uebersetzung vom Director Dr. G. Radde," was drawn up in view of the visit of the Geological Congress to Tiflis, and issued as *Mittheilungen des Kaukasischen Museums*, Bd. I, Lief. ii, pp. vi. + 40, 8vo, Tiflis, 1897. The exhibited local geological collections are arranged topographically, so as to illustrate the structure of the different districts. There is, however, a systematic series of characteristic European fossils, bought from Krantz of Bonn. All the geological collections are on the ground floor, in the first room; maps, sections, and photographs by V. Sella (many of which were presented by the English Alpine Club) are placed in appropriate positions; the walls are adorned with diagrams of fossils and pictures of reconstructed geological landscapes; the ceiling represents the mammoth, giant elk, and a group of saurians in low relief.

The Ethnographic Collection was largely enriched from the section of Domestic Industries in the Agricultural and Industrial Exhibition held in Tiflis in 1889. A big room on the first floor is devoted to this. The walls are hung with oriental tapestries, the floor carpeted with rugs of varied texture and colour. Life-sized figures of the numerous races of the Caucasus are grouped in various

parts of the room, many of them represented as engaged in their various avocations, while around these are the familiar objects of the house, the field, and the chase, as used by each race. These are all unprotected by glass. Photographs and smaller models complete this most interesting exhibit. Among the latter I may mention a series of *papier maché* models, each about 10 inches high, representing types of the various Russian races ; similar models are to be bought in St. Petersburg.

The Archæological Collection was brought together mainly by the local committee of the Fifth Archæological Congress (1881), and by the Caucasian Archæological Society, now defunct. Count Uvarov, President of the Congress, was particularly helpful to the Museum. Since 1881 little has been done in this direction, and Dr. Radde bewails the lack of any archæological specialist, who might revive an interest in the subject and be of use to the Museum. The collection, however, is large, and of remarkable interest as well as intrinsic value. It includes a fine series of coins, among them the Obrecht collection obtained by purchase.

At the end of 1891 a "Kurze Geschichte der Entwicklung des Kaukasischen Museums" was published by Dr. Radde. Since then there has been an annual "Bericht ueber das Kaukasische Museum und die Oeffentliche Bibliothek in Tiflis." The Museum has also begun the publication of "Mittheilungen." A detailed catalogue of the collections had already been in active preparation for some years at the time of our visit. I have not heard that any portion of it has yet been issued. The foregoing account is based on my own notes and on the publications of the Museum up to September, 1897.

The **Museum of Theodosia**, the ancient Caffa, in the Crimea, is mentioned here merely because I saw it. It is

a rough sort of building, rather like a deserted chapel, on a hill overlooking the town. The chief collections are those illustrating local archæology, but there is not much arrangement or elucidation. I was glad to get away from here to the house of Mr. O. Retowski, headmaster of the school, whose large collection of local fossils is well arranged, and worthy of close examination.

THE LESSONS LEARNT.

To a body of experts one cannot bring back from Russian Museums any addition to the modern methods of museum technique. The chief thing one can hope to show is the largely developed bump of acquisitiveness possessed by our Russian colleagues, and the wonderful mass of material that is being stored up to aid future scientific research. Still, suggestions of more special interest have from time to time occurred as we noted the contents of their galleries ; and, scattered and fragmentary though my observations have been, certain general ideas have gradually taken shape.

Each of the museums visited had its special character. Each was the representative of a different type of museum —sometimes a good and appropriate type, sometimes bad or inappropriate. A museum is and ought to be governed by circumstances ; to fight against them is waste of energy ; one should utilise them. Thus we have seen the museum of the Academy, the home of the specialist pure and simple ; the educational museum of Moscow University ; the technological, or at least, would-be technological museum of the industrial centre, Saratoff ; the museum of the field-geologist at Reval, a guide to the quarries and sections by which it is surrounded ; the Caucasian Museum at Tiflis, where science forms the hearth around which, after centuries of unrest, the varied races of this mountain

land may meet in communion and learn the saga of its past. Let us consider these things, and beware of setting up any official standard, any code of rules, to be followed by all museums, even by all in our little island.

Another lesson we may learn, that of intelligent co-operation. I do not know Dr. Radde's secret, but he seems to have solved a problem that has long perplexed us in this country—that of getting our specimens rightly determined by specialists. You must take a little trouble to find out the worker who really is interested in the subject you propose to him. Never mind how many people you bother; if they are true enthusiasts they like being bothered. Have confidence in people, and remember that the occasional loss of a specimen is nothing as compared with the increased value of a properly worked out collection. If a museum is unable for any reason to send out collections to specialists, then it must have a large and properly paid staff. It is the business of a museum to encourage culture, and to be a headquarters of intellectual activity in its various departments. A slight experience serves to show that the museums which prosper are those that enter into the most cordial relations with a large body of students. Such obvious remarks might seem unnecessary did not the same experience bring to light museums where these principles do not seem to be acted on.

Co-operation and strict adaptation to the primary object of its existence should be leading principles in the conduct of every museum. When the same science is dealt with by more than one museum in a single town, it is important that those museums should approach it from different points of view, and that they should not clash. Let us take the case of geological museums. It is astonishing how many ways there are in which the branches of this science may be represented in a museum. There is the teaching

museum that exemplifies the various principles of the science ; such a museum need not have rich collections—very common specimens will do so long as they are arranged with intelligence. Such a museum is the one at Moscow. There is the museum of a geological survey, which should be the perpetual witness to the truth of the surveyors' maps and descriptions, and which should elucidate the topographical and tectonic geology of the country. There is the mining museum, where all ores, sections and models of mines and of mining machinery are kept ; connected with this may be the museum of economic geology, as once was the case in this country. There is the museum of historical geology, where an attempt is made to trace the sequence of every stratum and every physical change, either for one country or for the whole world. Such a museum, grand in conception but detailed in execution, scarcely exists anywhere at present. To conclude, though perhaps not finally, there is the palæontological museum, where the biological aspect of the fossils is predominant ; this is the home of the type-specimen in its various degrees, the haunt of both systematist and morphologist, and the headquarters of the specialists in palæontology, or, better still, in that broader science of zoology which the world is learning to accept. Here is scope for half a dozen museums in a large city, and, if there are only three or four, there seems no reason why any two of them should have conflicting interests. And yet it seems fated that they always should conflict. It is difficult for a stranger to perceive causes or to suggest remedies ; but he may see the symptoms of disease clearly enough. At St. Petersburg, for instance, there are at least two great museums where palæontological collections are accumulating—collections of a purely scientific interest, and equally necessary to the studies of the specialist. These are the museums of the

Academy and the University ; while it may be supposed that the Geological Committee is not an idle spectator of the race. There are in the world three specimens of a remarkably interesting echinoderm, *Mesites* or *Mesocystis*. All three are in St. Petersburg ; but one is at the Academy, one at the University, and the third (which I could not see) at the Geological Committee's Museum. One would naturally expect the museum of the Imperial Academy to be maintained principally for the benefit of specialists and advanced workers ; that of the University as a teaching museum for students. For a teaching museum many specimens are not needed, as the example of Moscow shows so brilliantly. It would probably be an advantage to all parties if the main collections were concentrated at the Academy, which would thus assume the position occupied in this country by the corresponding departments of the British Museum. Similarly the collections of soils, and the maps of their distribution, would seem more fittingly connected with an economic survey than with a teaching establishment. I do not mean to suggest any general principle that a university should not manage a geological survey and a large museum for both specialists and the public. I merely maintain that similar but distinct establishments in the same city should arrange to have different spheres of activity.

It now only remains for me to tender thanks to the Honourable the Trustees of the British Museum for giving me the opportunity of making this lengthy journey—so profitable to many branches of my studies—and to the numerous friends, both new and old, whose hospitality and courtesy rendered this first visit to Russia as pleasant as it was profitable.

REVIEWS.

Essays on Museums and other subjects connected with Natural History, by Sir W. H. Flower, K.C.B.—This volume brings together, in a handy form, the most important essays and addresses upon museums delivered by Sir W. H. Flower. Those forming the first part of the book are, in the author's words, "more closely than any others connected with the practical work of my life—the advancement of scientific knowledge through the development of museums."

The forward movement of museums, now taking place all through the country, is largely due to the essays and addresses now republished. Now that the series can be read and studied in association, they are likely to be more productive of good than in the past, when scattered about in various Proceedings and periodicals.

Botanical Museums in Belgium and Holland, by J. M. Hillier. "Kew Bulletin," October, 1898.—A report upon botanical work of Continental Museums cannot fail to be useful, and that of Mr. Hillier, who is an assistant in the Museums of the Royal Gardens at Kew, is especially so.

Amongst other matters we learn that at the University Botanic Gardens, Ghent, a preservative solution of alcohol, with two per cent. of hydrochloric acid added, is in use, and giving good results.

The Royal Botanic Gardens at Brussels possesses an important and apparently very successful method of preserving flowers in their natural colours. The method is described in detail in the *Bulletin*, but we scarcely feel justified in extracting it. We would urge all interested in this section of museum work to secure a copy of the *Bulletin*, which costs only a few pence.

The School World.—We have received from Messrs. Macmillan & Co., Limited, the first part of a new sixpenny monthly, which, whilst dealing mainly with the ordinary subjects of study in secondary schools, is also to be used for the encouragement of studies in natural science. We gather from the notes supplied to us that the editor hopes to make *The School World* exert a great influence upon the popular estimate of public museums. Articles upon school museums will appear from time to time, and notes upon the plants, &c., of the month. The magazine is well got up, and has been long needed.

MUSEUM NOTES :

By H. Bolton and F. W. Knocke.

Chadwick Museum, Bolton.—The report for 1897, issued in January of 1898, records steady progress, and an interesting addition to the Museum, in the form of an “Observatory Bee-hive,” with glass walls through which the colony can be seen at work. The hive is put in communication with the exterior by an aperture in the wall of the building. We can well believe that, in the words of the curator, “to watch the movements of these industrious insects inside their home has excited the wonder and admiration of thousands.” Mr. Midgley is sedulously cultivating public interest by the delivery of short explanatory addresses to societies and schools.

The Bootle Museum. Eleventh General Report, March 25, 1898.—The re-arrangement of the collections has made great progress, the principal feature being a geographical arrangement of the bird collection in a series of new cases. Six lectures upon the collection, and intended for school teachers, were delivered in the first half of the year.

A journal recording the progress of the Museum, Free Library and Technical School is published once a quarter, and museum demonstrations and free public lectures are, we are glad to say, a strong feature.

The Bristol Museum. Report of Museum Committee, September, 1898.—The third two-yearly report records the death of the late curator, Mr. Ed. Wilson, F.G.S., in May, 1898, after fourteen years' service. A well-deserved tribute to his services is given by the Committee. His place was filled in July by the appointment of Mr. H. Bolton of the Manchester Museum, Owens College. Mr. F. W. Knocker, of the Corporation Museum, Leicester, was, in January, appointed to the position of assistant to the curator.

The visit of the British Association in September has served to stimulate increased interest in the Museum, and also resulted in a succession of valuable donations, including the whole of the late Mr. Ed. Wilson's extensive geological collections. The replacement of old cases by new was planned by the late curator, and the construction of four commenced before his death.

The Cardiff Museum and Art Gallery. Annual Report, October, 1898.—The report of this Museum is one of almost embarrassing progress, judging by the record of a year's accessions. The crowded conditions of the rooms has led to the utilisation of basement apartments for museum use, and finally, to a gift on the part of the City Council of a free site of one and a half acres in Cathays Park, upon which to erect a more suitable building. The Museum Committee are hopeful that the Cardiff Museum will eventually become a "National Museum for Wales." Museum notes and lists of accessions are published quarterly in *The Public Library Journal*, a new local publication.

The Grosvenor Museum, Chester. Twenty-seventh Annual Report of the Chester Society of Natural Science and Literature, May, 1898.—This Museum, like others, is recognising more fully the needs of science students, and during the year six new cases have been presented, in which is exhibited a special students' series of geological specimens.

The Fitz Park Museum, Keswick.—The interesting Museum of the Keswick Literary and Scientific Society, formerly in the centre of the town, has now been transferred to the Fitz Park, and its name changed. It contains a valuable series of Lake District rocks and fossils, and also a number of maps constructed by the late Rev. James Clifton Ward, whose Geological Survey Memoirs upon the Lake District are so well known.

The Liverpool Museums.—The publication of *The Bulletin of the Liverpool Museums*, commenced in 1897, has been continued. The extensive building operations to provide additional accommodation for the Museum collections and technical schools are making good progress, and are expected to be completed next year. The Museum galleries will be 240 feet in length and 33 feet in breadth, the upper lighted from the roof, the lower from the side. Laboratories for the director and staff will also be included in the new building. By the kindness of the authorities, we are enabled to add a plate (*see* frontispiece) showing the character of the extension.

The Horniman Free Museum, London.—A new building is in course of erection at Dulwich, which, when completed, is intended as a gift to the fortunate inhabitants of that suburb. The Museum will contain two lofty galleries, lighted from the roof, and will also possess, what all museums ought to have, a large lecture theatre, seating 300 people. The building will be surrounded by a park of 15 acres, also purchased and intended as a gift by Mr. F. J. Horniman, M.P.

The Maidstone Museum.—A local committee in Maidstone have during the year raised by public subscription the sum of £150 wherewith to purchase the Harrison collection of pre-historic flint implements, in order that it may be kept together in the county. When secured, the collection will be deposited in the Maidstone Museum, and should be serviceable in stimulating others to prosecute similar researches.

The Manchester Museum, Owens College. Annual Report of the Keeper, 1898.—The report contains an account of various American Museums visited by the keeper during the previous year. An account of the installation of the electric light read by Mr. Hoyle at the Sheffield meeting will be found on p. 95. A large number of lectures and demonstrations by professors of the College, and the keeper, has been given during the year. The Sunday opening is continued, and evidently regarded as a success. There is a strong appeal for funds.

The Peel Park Museum, Salford. Fifteenth Annual Report, October, 1898.—The work carried out under the superintendence

of the curator, Mr. Ben. H. Mullen, M.A., during the last few years is resulting in the creation of a museum of considerable interest and value. The report for the year is gratifying. The British birds have passed through the hands of the taxidermist for cleaning and renovating, and a beginning made upon the general series. A valuable loan collection made by the Lancashire Sea Fisheries Joint-Committee to illustrate the life and habits of the food fishes of the Lancashire coast was placed on exhibition for half the year, and proved extremely instructive and attractive.

The Warrington Museum.—The authorities of this Museum have just commemorated its jubilee, the institution having been founded in 1848. A history of the fifty years' progress and the addresses delivered at the commemoration has been published in pamphlet form. From the views of various speakers, we gather that Warrington is fully alive to the educational value of the Museum.

ADDENDUM.

The receipt from Messrs. Potter & Son, of Aldersgate Street, London, of a series of illustrated sheets showing various label holders, case fittings, &c., &c., most of which are likely to be of service to curators, has drawn our attention to the fact that as yet few firms in this country have been attracted to specially cater for the various needs of museums. Surely the need for museum material of a character which can best be described as "sundries" is such that it is worth attention on the part of many firms? At any rate, the possession of half a dozen well-illustrated catalogues would often help a curator to finish his work off better, or avoid what he himself might feel was a clumsy substitute for something neater. We trust Messrs. Potter and others will send out a catalogue of this character, and so enable museums to utilise more of their appliances than curators are yet aware exist. In the meantime, we understand they will be pleased to forward to curators illustrated sheets and samples of their specialities.

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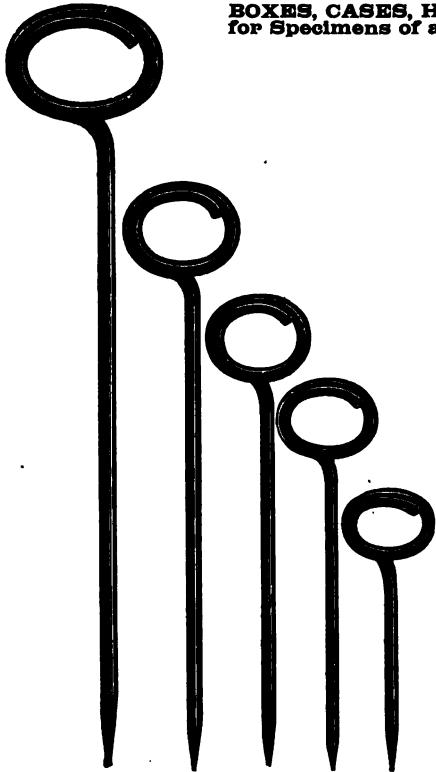
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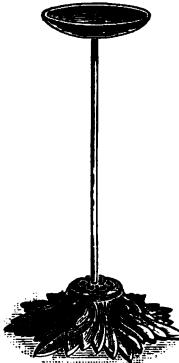
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Specially adapted for holding descriptive label on card
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be bent to any required angle, whilst the other clips
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36/- per gross, 4 in. 39/- per gross.

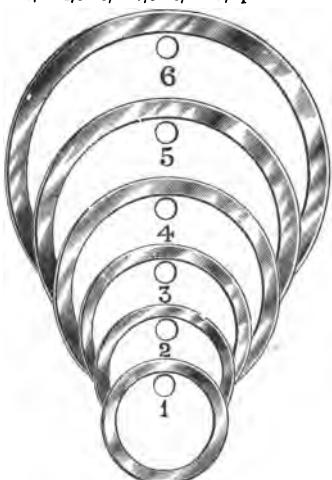
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METAL RIM TABS.

With White Card Centres. For marking Specimens where label cannot be affixed.
SIX SIZES.

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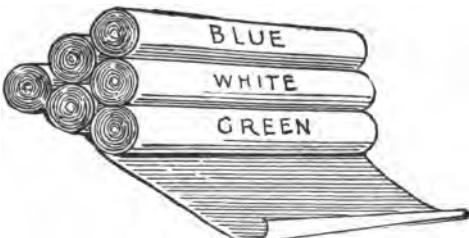
Lined white paper inside and black outside, as used at the Geological Museum, London.

No. long. wide. deep.

1	size 2 in.	$\times \frac{1}{4}$ in.	$\times \frac{1}{4}$ in.	- 18/- per gross.
2	" 2 $\frac{1}{2}$ in.	$\times \frac{1}{4}$ in.	1 in.	- 21/- "
3	" 3 in.	$\times \frac{1}{4}$ in.	$\frac{1}{4}$ in.	- 24/- "
4	" 3 $\frac{1}{2}$ in.	$\times \frac{1}{4}$ in.	$\frac{1}{4}$ in.	- 27/- "
5	" 4 in.	$\times \frac{1}{4}$ in.	$\frac{1}{4}$ in.	- 31/- "
6	" 4 $\frac{1}{2}$ in.	$\times \frac{1}{4}$ in.	$\frac{1}{4}$ in.	- 36/- "

The above 6 sizes assorted equally, 27/- .

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Specially prepared, extra stout, in all colours, 12 yds. long, 22 ins. wide. 2/8 per piece; 12 pieces for 25/-.

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3/6 per gross.

Its application is obvious. It has a sharp needle point, and will hold descriptive Ticket in any position in trays or cases. Can be put about in stands, &c. Altogether one of the most useful novelties ever introduced, and very cheap.

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SCREW HOOKS FOR CASES, &c.

Best possible make, guaranteed truly tapped, bronzed brass (non-corrosive).

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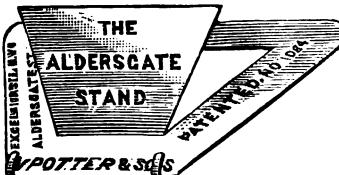
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For supporting descriptive cards at any angle.

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Same length, width, and finish as the boxes,

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No. 266. Size 24 \times 19, 6 sheet cardboard, 2/8 per dozen.

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REDUCED PRICES.



Ebonised edges, lined bottom, glass top and ends, and mirror back. These cases are adapted for showing any description of small specimens.

All these cases are lined blue velvet on bottom.

			First quality.	Second quality
8 in. long, 6 in. wide, 1½ in. deep,	-	-	5/-	3/6
10 "	8 "	2 "	5/6	4/-
12 "	9 "	2½ "	6/6	5/-
14 "	10 "	3 "	8/-	6/-
16 "	12 "	3½ "	9/6	7/-
18 "	14 "	4 "	11/-	8/6
20 "	16 "	4 "	13/-	10/6

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Can be obtained at all prices. In comparing lists, purchasers are earnestly solicited to consider *quality* as well as *rate*. Common cases answer very well for many purposes, but for first-class air-tight work of highest quality a high rate is compulsory. We quote for various qualities, and in each instance we *guarantee* to give *full value*. Packing cases are charged for, but allowed *in full* if returned in good condition, carriage paid, within seven days.

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Ebonised Mahogany,	15/6
Do., covered blue cloth	10/-



No. 47. 24 in. wide, 8 in. or 9 in. deep, any length not less than 4 feet.

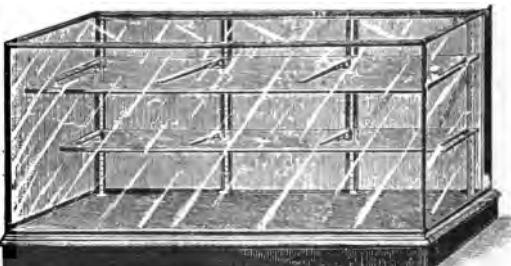
First Quality—Plate Glass, Ebony Rails, Air-tight, Mirror-lined Drop Doors,	-	-	35/- per foot.
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Strong Serviceable " " " Dust-tight,	-	-	22/6 "
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Including in every case a full set of Velvet-covered Moveable Trays. All packed free of charge, but Packing Cases must be returned Carriage Paid.

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Handsome Mahogany Plate-Glass Block Centre Case.

An excellent case for show purposes. The top, front, and ends are full ½-inch clear plate glass. The back fitted with mirror-lined doors to open. Inside fitted with tapped bars, bronze brackets (adjustable), and two rows of polished edge plate-glass shelves, 15 inches and 12 inches wide.



First Quality—Air-tight. B Quality—Dust-tight.

4 ft. long, 36 in. high, 24 in. wide,	-	-	£13 17 0	£11 15 0
5 " 36 " 24 "	-	-	16 16 0	14 0 0
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30 by 15 by 7 inches, - 32/- | 60 by 19 by 8 inches, - 75/-
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Ebonised Mahogany Frame, air tight, hook joint, black and gold cresting, clear plate-glass sides and top, silvered plate-glass and panelled door, movable brackets, and 2 polished edge plate-glass shelves, full size.

96 in. high by 24 in. by 24 in., £9 9 0
Do., with wood instead of glass top, 8 17 6
B quality—Ebonised hardwood, clear plate-glass all round, without cresting, shelves, or fittings, 36 in. by 24 in. by 24 in., 7 0 0

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Glazed top, front, and ends, opening at back, the door panelled, and lined silvered plate glass. Inside fitted with 8 brackets, tapped bars, and 4 plate-glass shelves (polished edges).

Crown glass front, top and ends, plate-glass shelves, dust tight.				Plate glass throughout, air tight, first quality.
Height, ins.	Width, ins.	Depth, ins.		
18	24	9	£3 0 0	£4 10 0
24	24	12	3 10 0	4 15 0
30	24	12	3 15 0	6 7 6
36	24	12	4 0 0	6 15 0



No. J23.

First Quality Centre Case, air-tight sashes, ebonised and polished mahogany, clear glass all round. Inside fitted with 4 tapped bars, and 2 polished edge plate-glass shelves the full size of case.

6 ft. high by 30 in. by 18 in.,	- - -	£19 0 0
6 "	36 " 24 "	24 0 0
7 "	42 " 24 "	29 5 0
7 "	54 " 30 "	33 15 0
7 "	72 " 30 "	38 17 6



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Clear plate-glass all round and top, carved pediment. Inside fitted with one full-size plate-glass shelf, 4 tapped bars and brackets. Splendid case for centre of room.

Height, ins.	Width, ins.	Depth, ins.	A quality, air-tight,	B quality, without pediment or inside fittings,
36	36	24	£15 5 0	£9 17 6
36	48	24	18 10 0	12 15 0
36	54	30	21 15 0	15 10 0
48	60	30	25 0 0	18 10 0

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